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Improved Scraper.

If any one thinks it funny to work out a tax on the highway, they have only to get an ordinary wheelbarrow, or a scraper, and try it for half a day, when the mistake will be apparent. The wheelbarrow breaks the back and the scraper dislocates the arms; between the two the way of the road maker is hard.

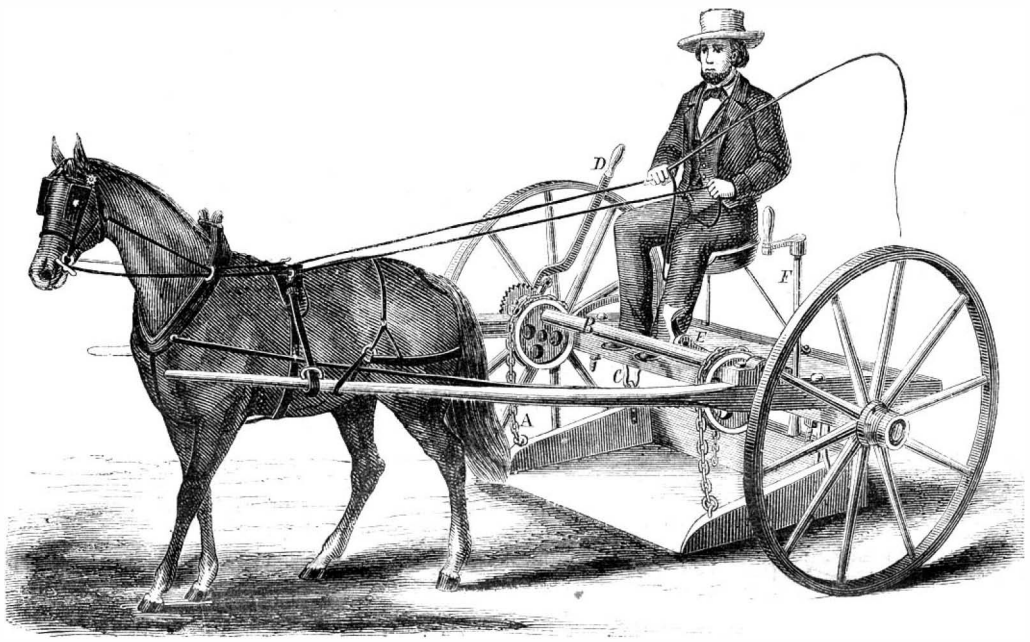
We consider the apparatus shown in this engraving a vast improvement on both the antiquated machines alluded to previously, inasmuch as it does a great deal more, and man rides instead of trudges along at the tail of his team.

In detail it is a scraper with an iron bottom fastened at the front by chains, A, to the transverse shaft, B, and hung on a crank shaft, C, behind.

This method gives the driver complete control over the front and back, for he can elevate or depress it, either to take up or discharge the load.

Of course by driving along, the earth is thrown up naturally into the bottom of the scraper, and when full the whole can be raised clear of the surface and carried off to any desired point. The levers, D and E, enable the driver to elevate the scraper; the wheels in front, over which the chains pass, are eccentric so that they lift like arms; and there is a ratchet wheel and pawl at the end of the shaft the wheels are on, to hold the front edge of the scraper at any angle, or desired hight. When the load is to be dumped there is a vertical rod, F, which serves to release the rear end of the scraper, thus enabling the driver to choose his own time and place for depositing the dirt.

All can see that this is a useful apparatus on highways or for farm use. It is also capital for a stone boat to carry away stones and can be employed for building railroads, canals, for grading and a variety of other purposes. The invention is covered by one patent, and application is pending by Theodore Blodgett, for another, through the Scientific American Patent Agency; for further information address the assignees of patent, Messrs. Walker & Judd, Belchertown, Mass. County, State and farm rights for sale.

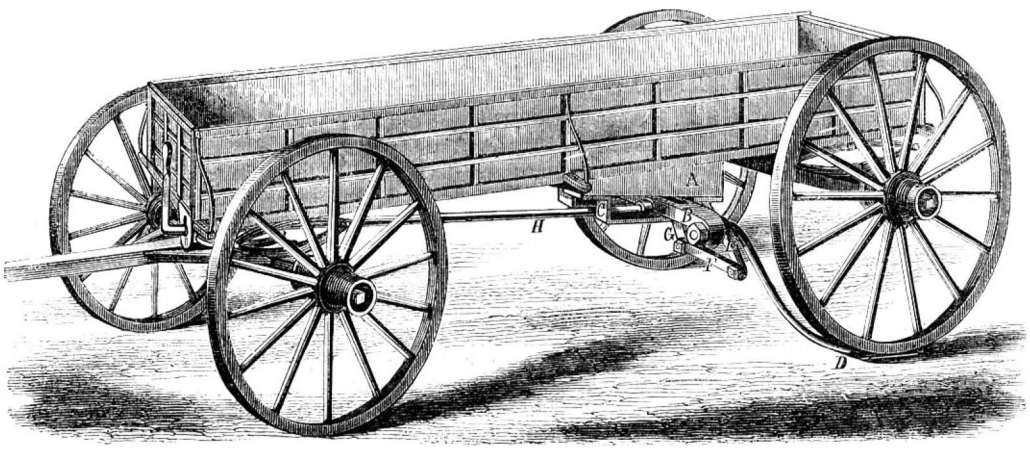


BLODGETT'S ROAD SCRAPER.

Improved Wagon Brake.

The accompanying engraving represents an improved wagon shoe lock, which the inventor claims to be superior to any device now used for locking wheels. The details are as follows:—

A is a block of hard wood bolted to the under side the bed, its lower face slightly inclined from the level of the wagon body. B is a crosshead having a reciprocating motion between two guides, C, which are bolted on the lower face of the block. On the outer end of the crosshead is a bar having the shoe, D, riveted or screwed to it, so that it can be replaced with little difficulty or delay when worn out. Near the upper end of the shoe bar is a crank, E, connected by a link, F, to another crank, G, on the end of the handle, H. This handle is also capable of a rotary motion through a quarter of a turn, and when revolved necessarily rotates the shoe bar an equal distance. There is a plate secured to the forward end of the bed, through which passes the handle aforesaid. The hole has a slot cut in it, affording passage for a stud pin attached to the rod at a proper distance to retain it when drawn up and revolved, in which situation the pin is retained.



HAMILTON'S WAGON BRAKE.

When it is desired to apply the lock, the handle is pulled forward, releasing the stud pin; a quarter turn is given the rod, which brings the pin opposite the slot, and through the intervention of the crank arms throws the shoe on the ground before the wheel. Both rods and the crosshead slide down as far as the guides will permit, which is a sufficient distance to interpose the shoe between the tire and the ground. In unlocking the wagon is backed until the wheel runs off the shoe, the handle is then pulled until the pin passes through the slot; a quarter turn is given, and the pin allowed to enter the hole in the plate, in which position the bar and shoe are thrown up under the rear axle, entirely out of the way.

The advantages claimed for this lock are, a complete preservation of the tire from grinding flat at any part of its surface; absence of strain on the spokes and fellies, while the wheel is secured as firmly from turning as though held by a chain; ease of manipulation, it being managed with one hand of the driver without dismounting from his seat; convenience as a "drag" in case of fracture of either rear wheel. If the near wheel breaks, the empty or lightly-loaded wagon can be conveyed to a shop by using the lock after the style of the time-honored fence rail. Should the off wheel give out the near one may be transferred to that side and proceed as before. Having no facilities for manufacturing, the right is for sale, entire or for States, by the inventor, Alex. Hamilton, 293 Pennsylvania avenue, Washington, D. C., by whom it was patented on Dec. 18, 1865.

A Long Tunnel.

The miners working in the middle section of the Sand Patch Tunnel, on the Pittsburg and Connellsville Railroad, have met, thus piercing once more the great mountain barrier between the Ohio valley and the seaboard. The Sand-patch tunnel is four thousand seven hundred and fifty feet long, or one thousand feet longer than the Allegheny Mountain Tunnel of the Pennsylvania Railroad. It was commenced some ten years ago, is to accommodate a double track of rails all through, being twenty-two feet wide, and nineteen feet high. The greater portion of it goes through solid red sandstone, not requiring any brick arching for that distance. The grade of the tunnel is twenty-two hundred feet above the level of the sea, or fifteen hundred feet higher than low-water mark of the Ohio river at Pittsburg. Mr. Sigismund Loew, the engineer of the Connellsville Railroad Co., informs us that it will take six months more with the force now employed, to finish the tunnel in ample time for the completion of the whole road from Cumberland to Connellsville, should that distance be put under construction this spring.—*Pittsburg Chronicle.*

A Good Whitewash.

At this season people generally set their houses in order and prepare for the hot weather. As whitewash is in great request it may not be inappropriate to publish the following recipe. It is intended for

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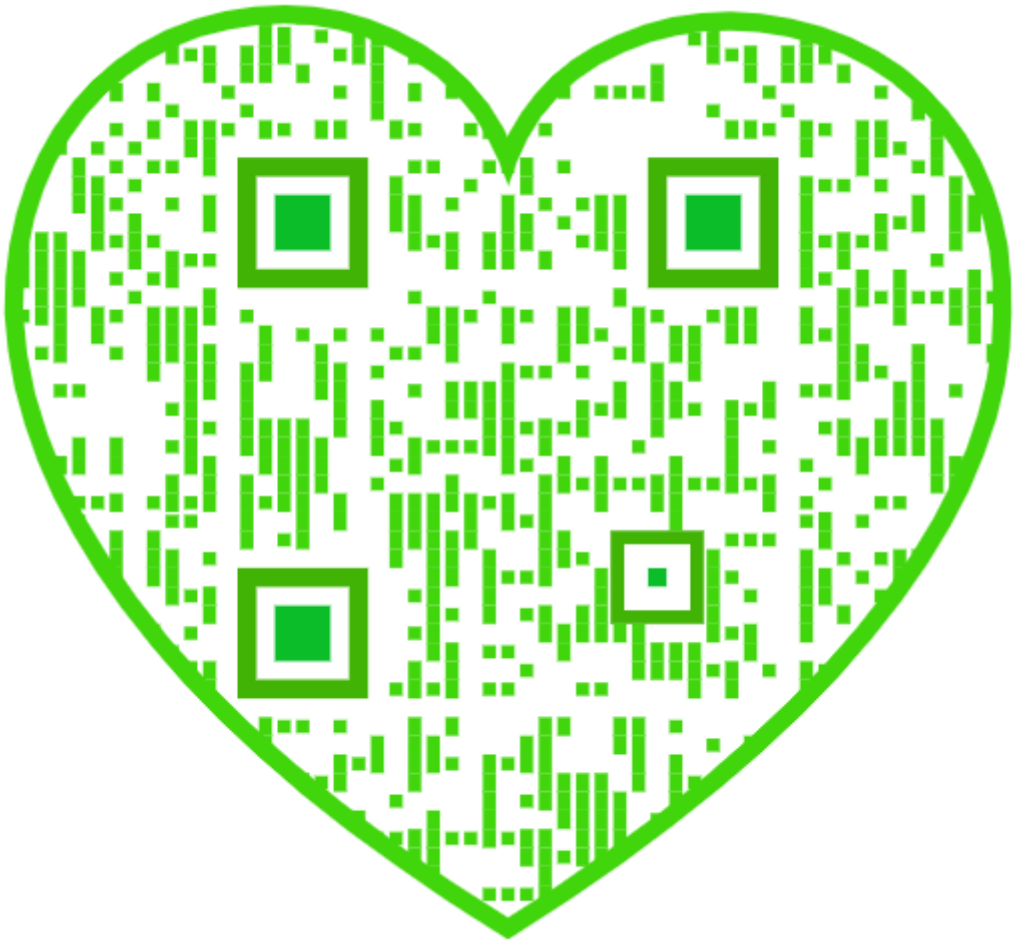

buildings or out door use but is also adapted for walls. Let us say here that we have never found anything equal to glue for fixing the lime on the walls. It should be liberally applied, say half a pound to a washtub full of whitewash, and if well stirred in will never fail. There is no greater nuisance than whitewash that rubs off on everything that touches it.—We quote from the *Chemical Gazette:*—

"Take a clean water-tight barrel, or other suitable cask, and put into it a half bushel of lime. Slack it by pouring boiling water over it, and in sufficient quantity to cover five inches deep, stirring it briskly till thoroughly slacked. When slacking has been effected, dissolve in water and add two pounds of sulphate of zinc and one of common salt. These will cause the wash to harden and prevent it cracking, which gives an unseemly appearance to the work. If desirable a beautiful cream color may be communicated to the above wash, by adding three pounds of yellow ocher. This wash may be applied with a common whitewash brush, and will be found much superior, both in appearance and durability, to common whitewash."

A NEW INTENSIFYING AND TONING AGENT.

Photographers are somewhat divided as to the propriety of using intensifying processes. "I consider that the most perfect developer," says one, "which produces exactly the right amount of intensity at the precise moment when the full amount of detail has been brought out, and dispenses with all necessity for intensifying by a secondary process." "I prefer the developer," rejoins another, "which permits the detail to be fully out without conferring much intensity, so that I can, by a second process, secure just the amount of intensity I require, when my sole attention is devoted to that point, undisturbed by the necessity of looking after detail."

On the whole, we are disposed to think that the best results are obtained when the conditions are such as render a slight amount of intensifying necessary; a fully exposed and harmonious negative, after receiving from such intensifying just that amount of vigor in the minute spots of high light which gives brilliancy to the whole, is, in our estimation, the best. Without entering into a detailed discussion of the subject, however, it will be universally admitted that there are occasions in the practice of every photographer when he must intensify, whether he desire it or not. The art is now rich in modes of obtaining density. Where a very slight amount of additional force is required, nothing exceeds the ordinary method with pyrogallic acid and silver; but if much piling up of the image be necessary, delicacy and sharpness are often slightly impaired, and stains and spots are occasionally caused. A large range of effects of intensifying may be secured by the various modes of employing bichloride of mercury; but most of these involve—especially in inexperienced hands—much risk of failure, and of subsequent deterioration in the negative; and are, in our estimation, generally to be condemned. The use of sulphides is generally disagreeable. Iodine is useful in a limited range of cases. Schlippe's salt, as proposed by Mr. Carey Lea, produced excellent effects; but the salt itself was not found in commerce, and it involved two operations, one with mercury or iodine, to prepare the plate, and then the application of the salt itself, to produce a scarlet or brown negative; there was also a risk of the deposit cracking into fissures in drying, and so spoiling the negative. Some other modes of intensifying have been proposed, but not generally practiced.

We have to bring a new agent under the attention of our readers, which appears to possess specific advantages which render it well worthy of attention, inasmuch as it is easy to use, very efficient as an intensifier for negatives, and is also a valuable toning agent for transparencies. Dr. Towler tried some successful experiments, and published a more definite formula, recommending a ten-grain solution of ferridcyanide of potassium, and a ten-grain solution of sulphate of uranium, to be mixed in equal proportions. Again we heard of experiments being tried with signal failure. We have, however, during the last week or two, tried a series of experiments with the most satisfactory results, and we can now, not only explain how these may be secured, but also the cause of failure in the hands of some of those who have unsuccessfully tried the experiment. We will first state the formula and mode of working. Take—

Ferridcyanide of potassium	10 grains
Water	1 ounce

Dissolve and mix with a solution of—

Persulphate of uranium	10 grains
Water	1 ounce

This mixture is a clear solution of a deep red brown color; and poured over a finished and washed negative, it at once changes the deposit (which, after simple iron development, is generally of a grayish color) into a rich non-actinic chocolate brown tint, and, if its action be continued, into a purple brown or warm black. This is effected without risk of stains or disadvantages of any kind that we have discovered. There is a remarkable similarity in color to that produced with Schlippe's salt, but the operation is much simpler, as the negative requires no preparation, and no subsequent treatment beyond washing. The first plate to which we applied the solution was an old glass positive, of bright silvery color, which had been taken many years. A bright scarlet color was at once communicated to the whites, which, on drying, became a reddish brown, but very non-actinic in character. Applied to a negative of somewhat insufficient intensity, the tint at once produced was a rich chocolate brown, both by reflected and transmitted light, rendering the negative more non-actinic in color, without sensibly increasing the deposit, and thus securing an important condition of delicacy as well as intensity, the requisite printing quality being obtained without piling up deposit and risking coarseness.

As a toning agent for transparencies nothing could be better. The rich, deep, warm brown at once assumed, or the deeper purple brown, approaching black, produced by a continued application, appears to us all that can be desired in collodion transparencies for any purpose. The freedom from risk or stain or injury of any kind, so far as our experience has gone, is most valuable. The solution may, if desired, be made stronger, and its deepest effect produced more rapidly if desired; but it appears to us that the strength we have indicated is the best for practical purposes. The solution may also be used over and over again, until its efficacy is exhausted.

ITEMS FOR LOVERS OF GARDENING.

We take the following interesting and timely suggestions from the *Horticulturist*:—

Remember to pluck off any fruit that may set on a newly transplanted tree or vine. If left to perfect, it will be at the expense of healthy, vigorous growth of the plants, and corresponding depreciation in quantity and quality of fruit the next season.

Grape Houses.—When the roots are entire inside, it is better to thoroughly saturate the ground once a week, or as often as necessary, than to be dribbling on water daily. With good drainage, the former course wets and stimulates all the roots alike, while the latter only gives but half a drink to those near the surface. With good, vigorous, healthy roots, no failures need occur, in growing grapes inside.

Dahlias and Double Hollyhocks form elegant features as backgrounds to a flower border, and masses of them, at intervals, on the sides of approach roads, are very pleasing, and help to give variety and charm to the grounds. In planting out the dahlias, use but one stem at a place; set them about three feet apart, and as they grow, pinch back, so as to make them grow more like bushes than trees. The waste of water from the kitchen—soapsuds, etc.—is one of the best manures for the dahlia.

Hollyhocks have come to be equally beautiful in flower as the dahlia; and, as they can be left in the ground, will probably become more and more in vogue. They should be transplanted and divided about once in two years.

Choice of Roses.—Although the hybird perpetual roses give bloom more or less during the season, and are perfectly hardy, so that they may be left out all winter, yet the beauty of a rose bed—one where buds and blossoms may daily be gathered—will be found to consist in having a large proportion of Teas, Bengals and Bourbons. Novelties, *i. e.*, new varieties, are brought out each season, one or more of which every amateur is expected to buy; but of the old sorts that have proved good with us we name Adam, Bougere, Caroline, Sombreuil, and Cels, as of Teas; Agrippina, Louis Philippe, and Lady Byron, as of Bengals; Bosanquet, Hermosa, Souvenir Malmaison, and Paul Joseph, as of the Bourbons. There are many others, perhaps, equally good, perhaps better, but the above small list embraces those that have always given us pleasure, as good growers and free bloomers.

Flowering Shrubs, such as Weigela, and others that flower on the preceding year's growth, should be trimmed back immediately after they have done flowering in June. By so doing, the plants can be kept in just such shape as may be desired by the operator.

Roses, as soon as the flowers have opened and bloomed one day, should have the decaying flower cut away; cutting back to a good strong bud, from which will come a new stem and flowers. Attention to this practice of cutting will keep plants blooming almost continuously.

When transplanting tomatoes, egg plants etc., set the roots in a pan of muddy water. Perform the work just before sundown, and few will fail. If the following day is a very clear, hot and sunny one, then it is best to shade them during the heat. Shingles, stuck on the south and west side, answer well.

Those who have peach trees should not fail to cut them back this spring, and so cause them to throw out new and vigorous shoots, and give improved shape to the tree. Do not cut, however, until about the usual time for the peach to bloom, but then head back severely. Old and scrawny trees will bear to be cut nearly back to mere stubs, or with limbs only one to two feet long.

Fruit Trees should be carefully looked over in April and May, and the webs or cocoons of insects destroyed. Any appearance of black knot on young trees should be cut away. If the coccus or scale insects shows itself, wash the bodies at once with strong lye and sulphur. Some advise a wash of salt brine all over the tree at this time; we have never tried it, and therefore cannot speak knowingly of it, but intend to be able to do so another year.

The white sugar beet, if grown in ground not too rich, we have found more delicate for the table than any other variety, if we except the bassano.

HOW FISHHOOKS ARE MADE.

The wire for making fishhooks is procured in coils from Sheffield or Birmingham, of different qualities, varying with the kind of goods required. All first-class hooks are made from the very best cast steel wire; other qualities are made of steel, but inferior; while the common sorts of large hooks are made of iron.

Cutting the wire into lengths suitable for the hook about to be made is the first operation, and is performed in two ways. The small and medium sizes are cut from the bundle or coil in quantities, between the blades of a pair of large upright shears, in the same manner as needle wires; but large sea hooks, made from thick wire, are cut singly, each length being placed separately upon a chisel fixed in a block or bench, and struck with a hammer. What are called "dubbed" hooks are "rubbed" after being cut,—that is, placed in a couple of iron rings, then made red hot, and rubbed backward and forward with an iron bar until the friction has made every wire straight. Hooks, in general, are not rubbed, but are at once taken to be "bearded" or barbed, which is thus performed: The bearder, sitting at a workbench in a good light, takes up three or four wires with his left hand, between the finger and thumb, and places the ends upon a piece of iron, somewhat like a very small anvil, fixed in the bench before him. In his right hands he holds the long handle of a knife of peculiar shape, the blade of which, having the edge turned from him, is placed flat upon the wires, the knife point at the same time being passed under a bent piece of iron firmly fixed, which enables him to obtain sufficient leverage to cut the soft wires and raise the barb, or "beard," this being done by pushing the handle forward,

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while the point remains fixed, as described. It becomes a laborious operation in the case of very large sizes, requiring, not merely a forward motion of the arm, but a strong push with the body against the handle.

They are next taken by the filer, who makes the points. Each barbed wire is taken up separately, fixed in small pliers held by the left hand, then placed upon the end of a slip of box wood, and filed to the degree of sharpness required. This is a matter of great nicety and delicacy. Common hooks are pointed with one file, but the finer sorts require two or three, flat and half round. Large sea hooks have the ends flattened, and the burr cut off on each side with a sharp chisel into a roughly-shaped point, previous to being filed. The points of "dubbed" hooks are not filed, but ground upon a revolving stone, and this process is called "dubbing."

When the points are made, the "benders" proceed to operate upon them. A woman holds in her left hand a piece of wood, at the upper end of which is inserted a curve, or "bend" of steel, projecting slightly. Taking a wire in her right hand, she catches the beard upon one end of the steel curve, and pulls the wire round into the proper "hook" shape. For the large sizes, the "bends" are fixed, not held in the hand.

Nothing now is necessary to perfect the formation but "shanking," which is done in various ways. Hooks are flattened at the shank end by a workman, who holds the curved part in his left hand, rests the end upon the edge of a steel anvil, and strikes it one sharp blow with a hammer. Some are tapered at the end with a file, while others are simply curled round, or "bowed," to provide a fastening for the line.

With steel hooks, hardening is the next process; but iron ones require converting, or "pieing," before they will harden. The pie hole is a recess with a large, open chimney, and in this recess is placed an iron pot, filled with alternate layers of hooks and bone dust. At a little distance from the pot bricks are built up all round and the space filled with coal, which, when lighted, creates an intense heat, and to its action the hooks are exposed for about ten or twelve hours, allowed afterward to cool, and are then fit for hardening. To effect this, they are exposed to a great heat upon pans in a fire hole, and while red hot, poured into a caldron of oil. Small hooks are afterward tempered in a kind of frying pan, partly filled with drift sand, and placed over a fire. The larger ones are tempered in a closed oven, at a low heat.

When these operations are completed, they are taken to the scouring mill. It is occupied by a number of revolving barrels, driven by steam power, and containing water and soft soap, into which the hooks are put, and allowed to remain for two or three days. At the end of that time, the friction having worn them all bright, they are taken out, and dried in another revolving barrel, containing saw dust. Blueing, japanning, or tinning follows—of which the two latter are performed in the ordinary way, and the blueing is done by exposing them to a certain degree of heat in drift sand over a fire, in the same way as small hooks are tempered. Counting, papering, labeling, and packing complete the series, and the goods are then ready for the market.

Readers of the foregoing description can hardly fail to notice the extreme simplicity of most or all of the processes; and it seems strange that in such an age as ours there should be little improvement in the mode of production, as compared with the fireside practice of amateurs two hundred years ago. In the "Secrets of Angling" the author describes the making of hooks (as practiced by himself) in the following terms:—"Soften your needles in a hot fire in a chafer. The instruments—First, an hold fast. Second, an hammer to flat the place for the beard. Third, a file to make the beard, and sharpen the point. Fourth, a bender, viz. a pin bended, put in the end of a stick, a handfull long. When they are made, lap them in the end of a wier, and heat them again, and temper them in oyle or butter."

THE Commissioner of Agriculture has received from Honduras, Central America, a swarm of stingless bees. These bees are easily swarmed, and are excellent honey makers.

[From the British Journal of Photography.]

On the Artistic Coloring of Photographic Portraits.

So difficult is the task of training a good colorist, that even the accomplished artist feels his inability in endeavoring to impart the information necessary to those he is wont to train in the knowledge whereby he is enabled to produce almost inimitable results. With the best intention he fails, feeling he cannot impart that which nature almost intuitively bestows, and he discovers that there is something more required than pigments, palette, and brush in the making of an artist.

But when the colorist, solemnly imbued with the truth of the photograph, and watching the fine management of its monochrome, from its high lights to its deepest shadows, can translate the same with a keen desire to imitate its inimitably delicate gradations into color; then indeed does the photograph as rendered on the ground glass of the camera serve as the true guide to the miniature colorist, and the result is a beautiful conjunction of nature and art to produce a faithful resemblance of the human face. Of course the taste of the artist will dictate to him to soften some of the harder lines rendered in the proof by the peculiar color of the original, or the furrows which time indents on the forehead, and which, by the concentration of the lines, may really appear deeper in the photograph than in the original.

Without attempting to go deeply into the philosophy of color, analytically or synthetically, it may not be out of place to give, however slight, an idea of how to proceed in coloring a photograph.

It is indispensable that you wash the proof well with a sponge, or, better, and ever at your command, sweep your tongue across it in order to remove any traces of grease or starch. As far as my experience goes the later method is preferable. In rubbing down the colors on the palette give all attention to the manner in which it is softened with the gum and water added. If you rub with careless quickness the colors are rendered useless, owing to the numerous air bells that rise, which, when applied to the surface of the picture, give it a coarse, inartistic, and anything but a pleasing aspect.

To color a good, clean print, you must, in the first wash on the face, use as much gum as will bring it nearly, although not quite, to the same gloss as the albumen surface; this wash to be composed of—for a person of ordinary complexion—a combination of rose madder and Indian yellow, or Venetian red alone. With these colors judiciously applied you can produce any complexion from the highest glow of health to the most sallow; the shadows to be warm, and in every case glazed even more than the albumen surface. Sepia, neutral tint, burnt umber, chrome yellow, and ivory black, if properly used, will give the blooming, graceful curls of the gentle queen of hearts, or the seared locks of the tottering dame of seventy, that life-like brilliancy which is characteristic of health or decay.

Should the photograph be clear and well-defined, for draperies and carpets (the coloring of which should ever be subservient to the figure), use transparent, but if the picture be deficient from under-development, use *opaque*. Of transparent colors for such purposes use the following:—Crimson lake and burnt sienna, Prussian blue and Indian yellow. Chrome yellow and Prussian blue also make an excellent wash for draperies, although not purely transparent.

For backgrounds, which should ever be made to softly recede from the figure, the following colors may be used with much purpose:—Cobalt blue, and a little Chinese white, which gives a good effect and altogether a pleasing result, vigneting it to your own taste with sepia or other browns. By way of finish, or to relieve an otherwise poor production, it is sometimes necessary to make what is termed an introduction; that is, a side opening in the background, where a neat landscape may be lightly sketched and colored, comprised of water, land, and sky, or a bit of woodland. These sometimes give a freshness to an otherwise dull picture, or serve to exclude some of those hideous backgrounds so much displayed in *cartes* generally. But in putting in draperies, carpets, plain or pictorial backgrounds, let them ever be subdued, and in quiet harmony with the figure, the head of which should ever be the principal attraction for the eye.

With these rather incomplete remarks I hope you will feel satisfied, as I assure you my *forte* does not lie in writing papers, nor do I possess the capacity to express in words that which I can render in color. The specimens I now show will, in some measure, serve as an apology, and embody my ideas of what artistic coloring as applied to photographs ought to be.

SCOTT ALEXANDER.

NEW ENGLAND INDUSTRY.

The following summary of New England items we copy from our excellent exchange the *Commercial Bulletin*:—

George Dwight, Jr., & Co., of Springfield, Mass., are manufacturing some steam pumps of larger size than heretofore made in the State. Three of them are to be placed in fire districts in New York City, and will be of the following dimensions:—Steam cylinder, 20 inches; water cylinder, 10 inches; 36 inch stroke.

E. J. Piper & Co., of Springfield, are manufacturing patterns of new copper-ore crushing machinery, which is to be used in the Lake Superior mines.

J. H. Walker & Co., boot manufacturers, of Worcester, Mass., are erecting a large addition to their old shop. The new building will be of brick, four stories high, 72 feet long, and 35 wide; the total length of their establishment will be 147 feet. When the improvements now going on are completed, the producing facilities of the firm will be nearly doubled; they will employ from 300 to 500 hands, and turn out 500 cases of boots per week.

The machine shop of Whitin Brothers, at Whitinsville, Mass., will employ over 1200 hands and will produce all kinds of cotton machinery except mules. The old shop is 306 feet long and 120 wide, and the new one will be 346 by 68, and four stories high. An ell is also building, 120 by 64 feet and four stories high—which will be used as a cotton mill—all the machinery manufactured in the shops being tested here.

The capital stock—$100,000—of the American Button Company has been taken up, a large portion being subscribed for by Amherst, Mass., people. The work of manufacture will probably be commenced in this city.

The works of William H. Blanchard & Co., at Worcester, Mass., are now in complete operation in the manufacture of narrow fabrics, and are producing from 20,000 to 30,000 yards per day, of skirt tape, carpet binding, and corset binding. Their goods are of a very superior quality, and their success fully demonstrates the fact that narrow goods can be made at home as well as abroad.

L. J. Knowles & Brother, of Warren, Mass., are erecting a brick block in Worcester, 175 feet by 45 and five stories high, for their own use in the manufacture of their patent fancy loom.

At the foundery of the Charlestown, Mass., Navy Yark, an immense lathe-bed has just been cast. It is 60 feet long, 6½ feet wide, and weighs 50,000 pounds. When it is finished it will weigh 80,000 pounds.

The Saugatuck Manufacturing Company, of Wakefield, R. I., are about to build a new mill on the east side of the river.

Pratt & Spencer occupy a portion of the old Slater mill, at Pawtucket, R. I., as a manufactory of tapes and webbing for covering hoop-skirts. Another part of the mill is used by the Slater Hair Cloth Company. This building was erected nearly a hundred years ago, but is still in a good state of preservation.

The Lewiston, Me., Steam Mill is 92 by 56 feet, and has a sawing capacity of about 30,000 feet of long lumber per day. The number of hands employed is 46. The company owning this mill has a capital stock of $50,000.

A company has been formed at Hartford, Conn., with a capital of $100,000, for the manufacture of mills, pans, and other implements for making sugar and sirup from sorghum.

A company has leased a ledge in Danbury, Conn., which is composed of stone, that is specially fitted for the manufacture of sand paper, and will go into the business on a large scale.

A PULL of 250 lbs. is the maximum effort which a good horse can exert for a mile.

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Improved Bolt Cutter.

We publish herewith the engraving and inventor's description of a new machine for cutting screw threads on bolts and in nuts. He says:—

"The revolving head in which the dies are fixed is the novel part of the invention, and is thus described as distinctly as possible without the use of detailed engravings:—

"Upon a hollow mandrel or spindle is rigidly fixed a die holder, A, provided with three slots to receive the dies; and extending back from these slots, and at right angles to them, and to the face of the die holder, are other slots in which are fixed small levers which operate to lift and open the dies, as further described below. A portion of the outer end or head of each die is made square and at right angles to its face; the remaining portion of its head is formed into an inclined plane, extending toward and prolonged beyond the back side of the die, thus forming a projection or hook on the back of the die; and when the dies are in place these projections rest on the outer ends of the small levers above-mentioned.

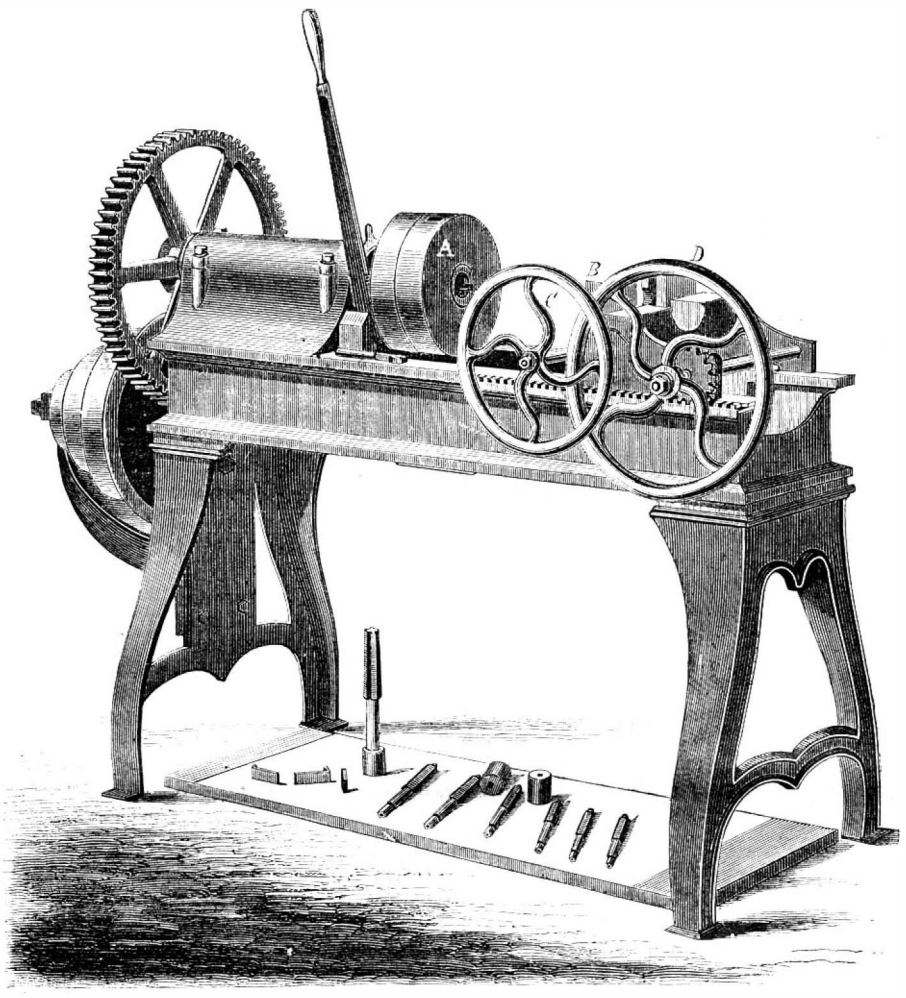
"In the rear of the die holder above described is a flange so made as to slide on the spindle, but made to rotate with it by means of a spline, or feather; and firmly fastened to this flange by means of two bolts passing through slots therein is a sliding ring or cylinder which encircles the die holder. This ring is provided with three internal ways or bearings, each of which being divided into six equal parts; every alternate part is made eccentric with the ring. The eccentric parts of the two inner (left hand) bearings are in similar position and relation to each other, and expand in the same direction with each other; but the eccentrics of the outer (right hand) bearing expand in a contrary direction. This arrangement of eccentrics is made to correspond to the reverse action of the levers, and the whole plan of the eccentrics is used to adjust the opening of the dies to the proper size, and thus to compensate for wear of dies.

"A face plate or cap, which is secured to the face of the die holder, retains the dies in their respective slots. This face plate has a flange on its periphery, which shuts over a portion of the sliding ring to exclude chips, etc., from the working parts Through this flange are openings corresponding to the die slots in the die holder, and through these openings (when the ring is carried to the left, as described below), the diesare passed into the die slots in the die holder, or withdrawn, as the case may be.

"The operation of the ring on the dies is this: when the back flange, to which the sliding ring is attached, is moved forward by means of the hand lever, the dies being supposed to be in place, the outer of the three bearings above mentioned comes in contact with the inclined plane of the dies, forcing them inward toward the common center till its face reaches the face plate, when the bearing rests firmly on the square end of the dies, and they are ready for the operation of cutting the thread on the bolt, and will receive the consequent pressure without yielding. The hand lever being carried back, the inner or middle bearing depresses the rear ends of the small levers—the outer bearing passing down the inclined plane of the dies simultaneously—and lifts the dies, thus opening them and allowing the withdrawal of the bolt on which the thread has been cut.

"A latch or stop at the rear of the back flange prevents the flange and attached sliding ring from passing so far back as to allow the ring to pass entirely off the projection on the back of the dies, so as to liberate them; and so long as this stop is in place the dies cannot be removed. By simply throwing up the stop and moving the ring a trifle further back, by the hand lever, the dies are made free and can be almost instantly withdrawn and others substituted.

"To adjust the dies for cutting smaller so as to compensate for wear, the slot screws at the back of the head, connecting the flange and sliding ring, are loosened, and the ring is turned upon the interior head or die holder, as an axis, so as to cause the eccentrics to act on the head of the dies and depress them. A reverse motion, of course, would enlarge the opening of the dies.



MERRIMAN'S BOLT CUTTER.

"The bolts are held, for cutting the thread, in steel jaws D, operated by a right and left hand screw cut on the shaft of the hand wheel, C. The bolt carriage is moved forward and backward by a hand wheel, D, with rack and pinion.

"For tapping nuts a cylindrical tap holder is fitted to the central hole in the head (the dies being withdrawn), and a stud on the tap holder passes through and locks past a notch in the face place into one of the die slots, thus holding the tap holder firmly in place. The tap holder is fitted with a square socket in its center, in which the shank of the tap fits.

"Three distinguishing advantages follow from the construction above described:—

1st. The screw is cut at a single operation and the dies are opened by the direct action of the hand lever to allow the bolt to be withdrawn. The movement of the lever to the right closes the dies ready for further use.

2d. The dies can be withdrawn in a few seconds and others inserted, without turning a nut or screw.

3d. The dies may be adjusted in a moment, with the most minute accuracy, to compensate for wear or any variation.

"The machine may be seen by calling on (or further particulars learned by addressing) S. C. Hills, No. 12 Platt street, New York; J. A. Merriman, general Western agent, 198 South Water street, Chicago, Ill., or the sole proprietors and manufacturers, H. B. Brown & Co., New Haven, Conn."

A CHILD in New Jefferson, Iowa, was fatally poisoned a few days ago by chewing pieces of an enameled paper collar. The enamel contains arsenic.

Induction Coils.

At a recent meeting of the Royal Scottish Society of Arts, held in their hall, George street, Edinburgh, Sheriff Hallard presiding, Dr. Ferguson read a paper on a new method of constructing induction coils, an abstract of which will be interesting to our readers. One peculiarity of the method consists in coiling the secondary wire round the primary coil, in lengths proportionate to the power of the primary coil at the point where the wire is coiled, there being least at the ends and most in the middle. By this construction, the length of the spark given by the induction coil is not purchased, as it generally is, at the expense of its volume. Another peculiarity is that the wire is wound in two parts, separated by a diaphragm, and the poles stand at the same distance from the primary coil. Both poles are thus alike a power. In the usual arrangement one pole is weak and the other strong. A coil constructed on this method by Mr. Hart, of College street, was exhibited, which gave readily dense sparks of eight inches in length. The insulation of the coil has been so applied and protected as to secure the permanent power of the coil. The length of the wire on the secondary bobbin is nearly seven miles. Another paper on a new current interrupter for the induction coil, also by Dr. Ferguson, was read. In this contrivance a spiral of copper wire, free to oscillate in the middle, is fixed at its end to a rod of iron as a case. A wire soldered to the coil comes out at right angles from it, and being bent down at the end dips into a cup containing mercury. The battery connection is so arranged that when the dipping wire is in the cup the galvanic circuit is closed. On the closing of the circuit, the dipper is drawn out of the cup, and the circuit is thereby broken, and the coil, under the action of its electricity, returns to its former position. The dipper is thus alternately lifted up and plunged into the cup, and a rapid series of interruptions is made. This interruption admits of a simple and perfect system of regulation, so that it can be made to move at any speed. It does away with the armature and spring of ordinary self-acting brakes, is quite continuous, and introduces almost no resistance into the primary circuit. The interruption was used with the coil, and several experiments illustrative of the merits of both were performed.—*Mechanics' Magazine.*

Cooper Union Night Schools.

The term of 1865–6 closed at this institution last month. Before the close each class was examined separately in the studies they had been pursuing during the term, and certificates were awarded according to the merit of the pupil. A certificate of the First Class being granted for superior ability and diligent attention; a certificate of the Second Class for ability and diligent attention, and a certificate of the Third Class for attention and good conduct.

The annual reception of the Art Department takes place on the 30th inst., and the Annual Commencement on Thursday evening the 31st inst., where all who feel a pride in the advancement of our young men are invited.

MR. JOHN BOURNE, the eminent English engineer, in speaking of shot for use against ironclad ships, says they might be so made that a shot of small diameter could be attached to a wooden piston, and fired from a large gun which would give the small projectile great power and velocity. Such shot were made and used during our late war, with what success we do not know.

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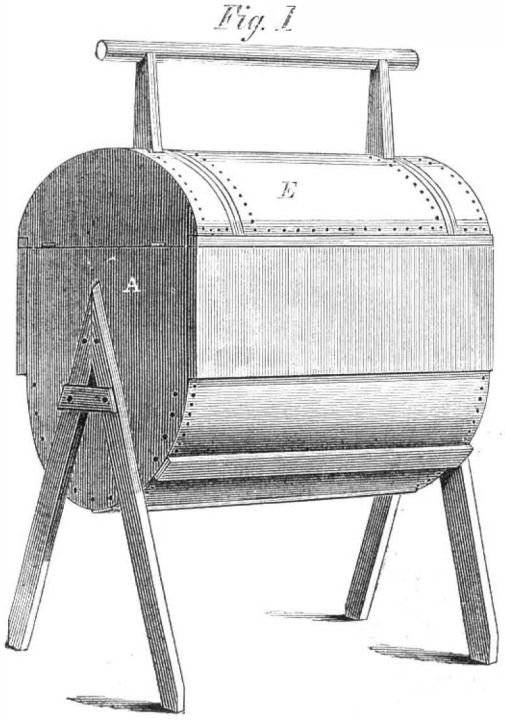
LUTES'S WASHING MACHINE.

Exactly how long man, or woman kind rather, were content to toil and moil over the washtub before they provided themselves with improved machines for the purpose, history does not record, but the horrors of washing day are within the memory of all. The reek of suds, the smell of boiling linen, the saponaceous vapors that lower darkly over all—who has not seen and smelt them? Who does not desire a release from them? One and all, we answer, forever and forever.

In many kitchens and laundries washing machines

Fig. 1

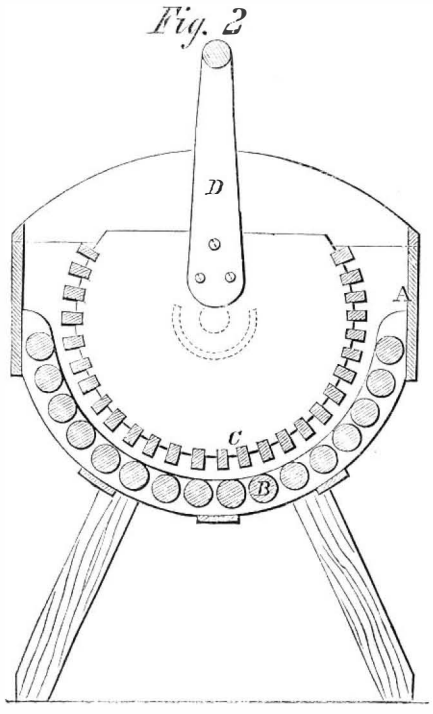


have entirely supplanted the ancient affair, and after a few minutes of vigorous "swashing" about in a tub of hot suds, the garments are pronounced to be more thoroughly cleaned, by good housewives, than they could be by hand.

We give an illustration of a washing machine which the inventor claims to be an improvement on those in general use, by its convenience and rapidity of action.

It is a semicircular case, A, having a zinc bottom

Fig. 2



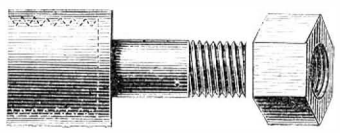
and a series of rollers, B, disposed over the same as shown in Fig. 2. These turn freely on their axes. Inside of the case is a slotted rubber, C, which is hung on centers and is worked by the arm, D. When the clothes are put into this machine they are carried alternately up and down by the action of the rubber and the rollers, and thoroughly wrinkled, so to speak, which both loosens the dirt and squeezes it out. This, in connection with the hot suds, soon obtains the result expected. In order to avoid the evils of steam and the splash which would otherwise occur, the inventor makes a cover which is in three parts, leaving small openings the width of the handle, for the same to work in. The center, E, of the top can be lifted out to put in the clothes and the two end pieces turned back on hinges, thus affording easy access to the interior.

Patented April 10, 1866. For further information address Philip Lutes, Platte City, Mo.

CORRESPONDENCE

Spur Chuck.

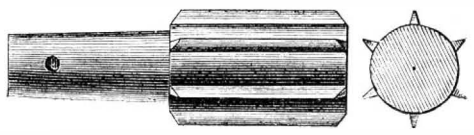
MESSRS. EDITORS:—Many contrivances are resorted to by wood turners, to hold their work fast to the mandrel, without disfiguring it, while turning it in the air. When a piece of plank has to be turned, it is not unfrequently held by a screw or gimlet-head chuck. This is very liable to cut out of the hole made for it, and it is very difficult to reverse the work, and turn the other side true to the first center. As many kinds of work allow the turner to drill a hole through the plank, a very efficient chuck is made with a shank of the size of the hole drilled; the wood is pushed on to it, and held fast by a screw on the end of the shank by means of a nut and washers of different thicknesses, as in the engraving.



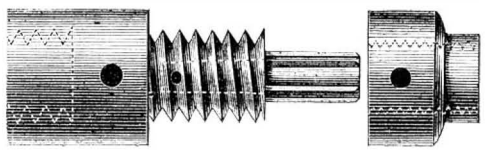
A variety of chucks, with drills to correspond, of this pattern, are very useful to a wood or even metal turner. The work can be reversed correctly, and ornamented on both sides; and I have made a great number of boxes and ornaments on this style of chuck; one was an oval work basket, with drilled work and eccentric cutting.

The last kind of chuck I have made, and which I call the "spur chuck," was suggested by an instrument called "the spur," employed in a manfactory of spools, to hold the drilled and rounded piece of wood while cutters shaped it, to hold the thread to be wound on it. The rapidity and firmness with which these prepared pieces were chucked and turned suggested the idea of using the same kind of spur to a chuck for a foot lathe. It has proved so handy and reliable a chuck for work, that I recommend its adoption by mechanics in general.

The "spur" is a steel bar, with six knife-shaped blades projecting about one-sixteenth of an inch. The blades are three-fourths of an inch long. The other end of the bar is made a trifle tapering, to fit a tapering hole in the chuck, and is fastened into the hole by a rivet or by solder; best of all, by both. The spur I describe will enter a three-eighth hole in soft wood, or a five-sixteenth hole in hard wood, such as rosewood. A view is here given.



Each turner will make the spurs of the strength and size he requires. The blades can be filed out, but are more accurately cut by a planing machine, and should be tempered to a blue color. The chuck, after it is put together, is here represented.



To use the chuck, bore a three-eighths of an inch hole in a piece of plank, or in the end of a short stick of wood, the hole to be three-eighths of an inch deep. You now drive the wood on to the spur with a mallet, or, which is much better, force it up with the screw of the back center, and then it is ready to turn; but previously put the loose nut on to the screw end of the chuck. Your work will rest against the large or small end of the nut, as you may wish it.

After turning your work, you force it off the spur by turning back the nut, and you can then reverse your work and turn the other side.

This is extremely useful for turning small patterns for the founder; but I have used it for elaborate turning and machine cutting in hard wood, without the least shake. For very many purposes it is the most handy chuck I ever used. It is not necessary that the hole should go through the entire thickness of the wood, unless you wish to reverse it.

If any of your readers will take a short piece of pinion wire, and file the teeth sharp and a little tapering to make an entrance, then drill a hole in a piece of soft wood, drive in the pinion wire, and put the projecting end of the piece of pinion wire into a scroll chuck, they will get an idea of the efficiency of the "spur chuck." E. J. W.

Lenox, Mass.

Gas Explosion.

MESSRS. EDITORS:—As I am suffering from a burn caused by the explosion of gas, it would be interesting to me to know your opinion in regard to the origin of the gas. I was at work on a copper cylinder four feet long by 16 inches diameter, with cast iron heads; it was a dresser cylinder, used for drying yarn with steam, but had been used for a number of years. Through the journals on each end is a half-inch hole to receive steam and let out condensed water. The arrangements in the cylinder being out of repair, I took off one of the journals. In doing this I took Tyler's burning fluid, composed principally of naphtha and suet, around the heads of four screw bolts, that were packed with lead and oil when put in; not a drop could possibly have got inside. The bolts being out and the journals fitting tight in a recess turned in the head of the cylinder, I put a little more around that to loosen them, also a few drops half way through the bolt holes to act between the journal and cylinder, to loosen them; after getting the journal off, it left about a three inch-hole. I rolled up my sleeves to my elbows so that I could get my hand in to adjust the scoop. After working nearly a half hour I took an oil lamp and in attempting to place it within the cylinder the gas that was within the cylinder exploded and blew the skin entirely from my arm between my wrist and elbow, and badly burned my hand.

There was about two quarts of water in the cylinder, which had been there since it was used. Now, was this gas produced by the fluid I used or could it be caused by this water becoming stagnant, and the two metals acting upon it or upon themselves, thereby producing a gas that would be so powerful as to make a report as loud as a gun? Can you give me the facts through your journal?

E. W. DEAN.

Norwich, Ct., April 30, 1866.

[To account for the explosive mixture it is only necessary to know that about an ounce of the naphtha got inside of the cylinder; this is the most plausable theory. The decomposition of water theory requires that the water of the cylinder should have been corrosive to iron. We have known of several similar accidents, where there was no doubt that naphtha or petroleum was the cause.—EDS.

A Body Falling Through the Earth.

MESSRS. EDITORS:—Being a constant reader of the SCIENTIFIC AMERICAN, and having seen much on the subject in its columns, I would like to inquire of some of its readers that may know more on the subject than I do, what would be the shape of the line or figure described by a ball let fall through the earth from the equator, supposing the ball was to oscillate from side to side several times as it would in a vacuum? A READER.

[It is not in the power of the present knowledge of mankind to answer this question. The motion of the ball would be modified by the rotation of the earth on its axis, by its revolution around the sun, and by the translatory motion of the solar system among the stars. It is probable that the motion of the solar system is in a vast orbit, the center being in the vicinity of the Pleiades, but the form of the

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orbit, and the velocity of the motion are not yet definitely determined.

As the rotation of the earth upon its axis carries the surface at the equator from west to east with a velocity of about 17 miles per minute, a body having this velocity, dropped into a vertical hole, would soon come to parts having a less eastward velocity, and would strike against the east side of the hole.—Eds.

Confederate States Patent Office.

Messrs Editors:—I made application to the Patent Office of the Confederate States, at Richmond, for an improved machine for turning irregular forms, for which a patent was granted me. The model and papers all went up, I suppose, in the evacuation and surrender. If the papers or model are in possession of the Patent Office at Washington, and if you can give me any information about them, I will be very thankful.

If it could be obtained I do not know whether it would be worth making application to the Patent Office at Washington, or not, under the circumstances. Please give me all the information you can consistently, with your views upon the matter.

John L. Hudson.

Cumming, April 25 1866.

[As much curiosity has been expressed in regard to the Confederate States Patent Office, and the records accumulated by that defunct institution, we have made some inquiries, the result of which is as follows: The Commissioner of the United States Patent Office, in June last, sent a commissioner to Richmond, Va., under the charge of Ex-Governor Farwell, of Wisconsin, one of the Principal Examiners of the Patent Office. He was furnished with orders from Major Generals Halleck and Terry, and thoroughly examined the matter, but without finding any specifications, drawings or models. They, together with the other records, are presumed to have been destroyed in the fire which desolated the city.—Eds.

How Taps are Made in New England.

Messrs. Editors: — In late numbers of the Scientific American, I notice several letters and answers about taps, their proper form, etc. In these matters of detail, I think the small shops of New England are well in advance of many large establishments elsewhere. The taps used here for threading nuts are made long enough to have a place turned down on each end to hold four nuts of the common thickness. The middle part is then threaded perfectly straight, after which the lathe is set tapering, and nearly all of the thread is turned away at the small end, while at the large end enough in number of the threads are left intact to insure a perfect size to every nut that passes over it. It is then fluted with four cutting edges, though for very small sizes three will do; the teeth are not made much "hooking" and the flutes, or channels, should be deep enough to prevent clogging by the chips from each nut. The teeth are cleared by filing on the back side.

These taps are used in a common lathe, and when made of good steel and well tempered, can be run at a comparatively high speed with no trouble from heating, if well oiled, and will thread thousands of nuts with no perceptible wear.

For almost every other work this form of tap is useless; the old way was to start the thread in the top of a hole, with a tapering tap. Then followed the plug tap with its few narrow flutes and formidable bearing of thread, and by dint of much labor it grubbed and tore its way to the bottom. All this is changed. We have learned better. We make a number of plug taps—say about a dozen—beginning as small as ever needed for that number of thread, and making the next one $\frac{1}{32}$ larger, and so on to the largest; making each one with its exact size in 8ths, 16ths, and 32ds. These, with several tapering ones to start them with, will embrace every size needed of that thread, and should not be tumbled about on a shelf or bench, or carried in the pockets of the workmen, to and fro, but arranged in a circle around a central knob in a handsomely turned block. They are then decidedly ornamental. The block can be carried to any part of the establishment, and the work easily and rapidly done, using one tap after another. This method is of great advantage where the holes to be threaded are in a corner, or near a flange, necessitating a single one ended wrench. For this kind of work every possible form of tap has been made, but we find none so good, all things considered, as the square.

The form of thread is the strongest, and cuts easily, both backward and forward, and when old and dull, can be ground. The thread on each tap being about two diameters long, and cut a little tapering, the point being the largest, this will prevent binding like a wedge after the tap is worn by use. Two or three threads at the point must be chased smaller; they should not be squared quite down to a sharp corner. No tap should ever be polished between the threads after being cut, the peculiarly fine roughness left by a tool in cutting threads on steel being a decided advantage, filing its way through the work, making a smooth thread and preventing the sticky squeak so often heard in tapping hard substances.

Please excuse the length of this. It is by attention to these details that we are to arrive at that desirable, rapid working of iron, so slow at the best, which is to play so important a part in the advancement of civilization and the development of our country.

George E. Fifield.

New Market, N. H., May 2, 1866.

[We have no doubt but that our readers appreciate the value of these technical letters as much as we do. Nothing is more useful to all metal workers than an interchange of ideas relating to the practice of their trades. Though we may not always agree with the writers in all respects, we are willing to give them a hearing, and hope for a continuance of their favors.

We do not believe in making taps for Tom, Dick, and Harry to use, with odd thirty-seconds. We have seen great confusion from one man taking the wrong tap, while another cut the bolts or screws of the standard size. We have never found more reliable or better work for all purposes, than two taps will do — one taper and one plug.

A great mistake is made in drilling the holes for taps; but few consider it of much importance. Where a hole is of the right size the tap runs through readily; but where it is the least bit too small the bottom of the tap jams against the crown of the thread cut by it, and not only produces excessive friction, but injures it by straining.—Eds.

On Balloons.

Messrs. Editors:—I find in your last week's issue an interesting treatise on "Balloon Navigation," which gives much new information upon the subject. There is, however, a different point at issue in this question which is not given, and I should be pleased to be allowed to put on record some views given by a distinguished scientific engineer several years ago. The great primal trouble in the solution of air navigation arises from the persistency of æronauts, in attempting to propel a balloon, a huge mass of a yielding nature wholly unadapted to the designed purpose. An elephant with wings in an apt illustration of what is attempted by balloon navigators. We find that the Almighty has given its inhabitants in other elements forms and powers perfectly adapted to its wants. "Man in designing vessels to navigate the waters, either by sail or steam, take as a guide the form of a fish, in its most essential details. So also in constructing bodies to navigate the air must we keep in view certain elements of form which we find in nature, and abandon the balloon system for a self-supporting and propelling combination. In other words, as birds raise themselves and move through air with their wings, so must the coming air propeller by its own mechanical power possess its lifting and propelling power combined. With a proportionately small area of surface in the body of the vessel, the resistance to air currents is very small, while the buoying and propelling power can be great and more immediate in its action."

While we have no motor which possesses the economy found in animals and birds, yet the present forces at our command can be applied to this principle with sufficient success to insure its further development. I venture the prediction, therefore, that balloon navigation will always remain an unsuccessful problem, while I am convinced that the principles of air navigation which I have given are ideas in the right direction toward solving this interesting mode of traveling.

As these views possess much that is original, and of merit I would be pleased to have them put on record. L. A. E.

New York City, May 9, 1866.

The Best Drill for Hard Wood.

Messrs. Editors:—Will some of the many readers of the Scientific American please inform me the *best* kind of drills, from $\frac{1}{8}$ inch down, for drilling endwise in hard and soft wood, from one to five inches in length, and to run perfectly straihgt.

West Meriden, Conn., May 6, 1866. E. C.

Query for Painters.

Messrs. Editors: — I want to work at ornamental painting in oil colors, consequently must thin my colors with either naphtha or spirits of turpentine; but I cannot use either, as the smell makes me sick. Can you tell me of anything that I can use in their stead. The work is to be varnished, and the paint comes to no wear. I have heard say water and white vitriol was good. J. S. C.

May 4, 1866.

How Does He Do It?

Locked up in a cell in the Henrico county jail, in Virginia, is a man named Chastain Hampton, who has been sent on by the justices on a charge of horse stealing. Hampton was fastened to the floor with an iron anklet, chain and ring, but in some mysterious way he smashed the anklet as if it was only a woman's garter. He was ironed again, with the same result as before; and so for seven times in succession did this thing happen, to the great bewilderment of the blacksmith who made them, who swears by hammer and anvil that Hampton must be the devil. No tools have been found in the cell by which the smashing could be done, unless they be concealed in his clothes, which, we believe, have not been searched. The clerk of the court, as soon as Hampton is left to himself, can hear the sound of his work in casting off his irons, which, by the way, it appears he does in derision of his keepers, and not with any view of making his escape.

[This is very hard to believe, nevertheless there are many strange things done in this world which seem impossible—the question is how does he do it?—Eds.

A New Scientific Toy.

There is a successor to "Pharaoh's serpents," called the "magic photograph." It is selling in Paris and London, in two envelopes; one containing pieces of white albumenized paper, the other slips of white blotting paper, of a corresponding size. One of the former is moistened with water, and a piece of paper from the other envelope, likewise wetted, is laid thereon when a beautiful photograph is immediately developed on its albumenized surface. Photographs have of course been printed in the usual manner on the albumenized slips, and then decolorized with bromic or iodic acid or some such agent; the other pieces of paper have been soaked in hyposulphite of soda, and the application of this reducing agent to the hidden photograph brings it again to view. The "serpents" emit a poisonous fume while burning, and the danger attending their use has driven them out of the market; but the "magic photograph" is safe as well as pleasant.

Gutta Percha Cement.

Dissolve a quantity of gutta peacha in chloroform in quantity to make a fluid of honey-like consistence. When spread it will dry in a few moments. Heat the surfaces at a fire or gas flame until softened, and apply them together. Small patches of leather can be thus cemented on boots, etc., so as almost to defy detection, and some shoemakers employ it with great success for this purpose. It is water proof, and will answer almost anywhere unless exposed to *heat*, which softens it.

Sea Water has a curious action on cast iron, converting it into a grey, porous mass, that grows rapidly hot in contact with air. Some canons fished up near Scotland became so hot that they could not be touched.

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A VISIT TO THE OSWEGO STARCH WORKS.

The rapid progress of the American people in everything pertaining to the glory and happiness of a nation, is promoted chiefly by the grand idea of doing everything, not as good as other nations, but a little better, and on a scale that corresponds with the ambition of the people, foremost in liberty and in generosity of thought and application. It is this spirit that produced the needle threader and the sewing machine, when European *savans* thought such utopian ideas unworthy of a man's thought; the same spirit created ironclads superior to those produced by the genius and riches of Europe's potentates; the same that meets us wherever we turn within the busy boundaries of our Union.

Few ever reflect how needles, pins, or buttons are produced; being such common affairs, they seem hardly deserving of attention; nor will many be likely to bother their minds about the source and the manner of producing starch, that can be had at any grocer's for a few cents per pound, although it plays an important point in the wardrobe of the household, causing happiness or misery according to its timely or wrong application. As for the anxiety of mothers to have a good supply of arrowroot for their helpless darlings of "prepared starch for pudding," it is too well known to require even mentioning, and to explain briefly, how the progressive subject of the United States suggests that of pudding and starch, I would only say, that while we may justly be proud of of a great many of our institutions, from our bootblacks and newsboys, up to the boot factories in New England, and our newspapers all over the country, from the management of our endless farms up to that of our entire nation, we may also justly be proud of having the largest supply of raw material for the production of starch and of the largest factory in the world for producing the material in the most rational manner imaginable.

This factory is situated at Oswego, N. Y., on the river of that name, communicating by canal and lake with the great West and the busy East, while railroads in both directions afford all the benefits of those signal institutions.

With the exception of some flower mills this starch factory is the center of attraction of Oswego, for the substantial solidity of its construction, while the genius and capital lavished upon it are rarely equaled and never surpassed. The establishment occupies ten acres of ground, six of which are covered by brick buildings five stories high, one of which being surmounted by a tower gives it the appearance of a castle of by-gone days. This idea is increased by the high fire walls separating the factory from neighboring establishments, and the large ominous letters over the entrance, "No admittance." The spell of the ominous greeting above the entrance being broken by our gentlemanly guide, Mr. Thomson Kingsford, we entered the "old factory," erected by Mr. Thomas Kingsford in 1842, which was afterwards yearly enlarged until all available space was used up, and the "new factory," a few steps distant from the old one, was erected in proportions corresponding to the daily increasing demands of the establishment. At first sight the interior of the old factory reminds one of the man who "couldn't see the woods, there being so many trees in the way," such a profusion of tanks, and mills, and screens, and shafts with cogwheels and pipes meet the eye, in fact, a labyrinth of machinery, difficult for any one man to plan, and which could only be a result of periodical additions corresponding to the timely wants of the place. In the midst of this chaos of machinery iron pillars tower up, which support the grand structure; the pillars in the lower floors being fifteen inches in diameter and nearly two inches thick, decreasing in thickness and diameter as they rise to their elevated positions. On the top of each column iron branches spread out to support the tremendous weight of hundreds of tanks, filled with starch and water. Arriving upon the top floor, Mr. Kingsford had curiosity to know whether we easily got dizzy, and although the answer was in the negative, we thought it prudent to hold on to an iron rod while we looked down the "deepest corn bins of the world," five stories deep, crossed at different points by iron rods placed there for the better support or bracing of the structures, of which several are arranged side by side, having a capacity of two million bushels of corn, this being the chief material used at the works for the production of starch. Capacious elevators are used to discharge the grain from boats into these receptacles, and to remove it again for the use of the works. The grain passes through enormous fan mills, where impurities that might endanger the mills, are removed. The grain passes right on to vats of enormous size, to be softened, so as to render the gluten and albumen more soluble, and enable the starch to be more easily separated from its impurities.

This process in former times occupied many days, even weeks, but it is now greatly facilitated. After this process the grain passes through a series of mills, consisting of burr stones, and heavy iron rollers, the works containing fifteen of the former, and six pair of the latter, which rattle away day and night unceasingly, changing the grain into pulp suitable for the extraction of the starch and its separation from the hull. This latter task is accomplished by a great number of screens or drum sieves, which perform their silent labors more perfect than human hands could do it even with the utmost attention and dexterity.

The refuse retained in the interior of the sieve drums, drops out at their ends freed from the white flour, the production of which is the object of all the heavy and intricate machinery employed. It falls through appropriate channels into vats, whence it is taken and used as food for cattle, being very nourishing, although not quite as fatteng as the entire grain. The starch when washed out of the sieves, is deposited in vats, which cover several floors as far as the eye can reach, having a capacity of five million gallons. It now receives the washing of chemicals and water necessary for its purification, the latter being filtered for all purposes of the works, so that it is impossible either by accident or design to use anything but pure clean water within the establishment. Forty large force pumps are used, to supply the necessary quantity of water, and for pumping the starch water to its different points of destination. The pumps are supplied with hose on every floor, to be used as a guard against fire and are sufficient to throw torrents of water high above the works and to flood them in a comparatively short time, the entire machinery is run by the water power, afforded by the locality, while a steam engine of one hundred and fifty horse-power is ready for use in very dry seasons. Shafts in parallel lines and on terraces at different hights, run through the entire length of the buildings over the vats, where the starch is stirred for the purpose of washing. The pleasing effect of these hundreds of wheels turning quickly and moving huge agitators in immense vats, filled with the heavy weight of starch and water or chemicals, apparently without any effort, can be better felt than described.

The purification of the starch depends more upon practical experience and personal skill than upon theory, and it is therefore superfluous, to say much on the process employed by Mr. Kingsford, who has the credit of being the very first who successfully produced corn starch in this country.

The purified starch has to be separated from the water, and for this purpose it is run into molds similar to those employed in the manufacture of glue, where it settles into solid cakes. From these molds the cakes are tipped out, broken into square pieces, which, after drying, weigh seven pounds, the size having been determined by long experience. These pieces are then placed into a brick kiln, where, at a low heat, the water is evaporated and the cakes are thus deprived of their impurities which appear in a yellow crust on the surface. As soon as this takes place, they are removed from their tropical resting place and scraped, which is done by hand with large knives. Freed from their yellow dress, the cakes are wrapped in blue paper and once more exposed to their turkish bath, where they remain until "dry crystallization," has taken place, *i. e.* the starch, and upon opening the paper it falls into crystalline pieces, in which form it is commonly sold.

The starch is then finished ready to be packed, which is done in different ways according to the quality of the starch and the purpose for which it is to be used.

The common grades of starch are packed into flour barrels and pounded in, in order to economize space. This is done by hand as also the packing of the next better grade, called "silver gloss starch," which is placed in boxes holding exactly six of the packages as they are taken from the drying room.

These boxes are manufactured at the establishment in a separate building, containing a planing mill with all those accessory appendages for the successful accomplishment of its object. Four million feet of lumber are used annually in the manufacture of these boxes, the fastening of which consumes seventy thousand pounds of nails.

Next in order comes the corn starch for puddings, a good substitute for arrow root, for which it is frequently bought. This is put up in paper packages, tasty in appearance, by the dexterous hands of females, of whom a great number are employed in a separate building, set apart for the purpose.

Gypsies, seasides, etc., don't seem, to have penetrated there yet, but the young ladies wear paper caps of ther own manufacture, which protects their curls or waterfalls from the starch dust, floating about in the air.

The wrapping paper, used in this department, amounts to about 160,000 pounds a year. — The number of packages put up during the day by any one girl, is on an average from fourteen to fifteen hundred.

In this department a machine for packing, or rather filling these paper packages with starch, deserves attention. It is one of the many patented machines of Kingsford, which run a race with swift time. In the old manner the packages were filled by means of a square tin frame, and the starch was pounded in by hand. The dust created by this operation rendered the room similar to a grinding mill, while the loss of starch wasted in dust, was not inconsiderable. The new arrangement consists in a miniature mill or a series of mills, keeping the starch finely powdered. At the bottom of the paper is slipped over an attached metal frame corresponding in size and shape to the intended package.

The paper, by an automatic arrangement, is filled and pressed in a second, no dust arising, not even enough to soil the exterior of the packages. Another building contains a complete machine shop, where patterns of all the machinery used, are kept, so as to secure the works against any great loss of time by accident.

A spacious warehouse, four stories high, a separate building for offices, does not detract from the value and beauty of the works, where, with as much regularity as that of clock-work, twenty-five tuns of dry starch can be turned out daily. The establishment gives employment to three hundred and fifty men, which, considering the great amount of labor-saving machinery, is certainly a formidable array.

As a cursory review of the works we may say, that the capacity of the mills is nearly a million of bushels of corn per annum. The coal used for the production of steam employed in the drying chambers, is obtained chiefly from Pennsylvania, and amounts to nearly three thousand tuns annually.

The length of the shafting used in the works exceeds seven thousand feet, while nine hundred gear wheels constitute the clock-work driven by the untiring exertion of the Oswego river. Twenty-five thousand feet of gas pipe convey the steam through the drying rooms, while the length of those kept in readiness for use in the case of fire, measures over seven thousand feet. The amount of water the pumps can discharge through the same, is five thousand and four hundred gallons a minute, or three hundred and sixty thousand gallons an hour.

The gutters carrying the starch mixture to its appropriate receptacles, measure five miles in length, and give a fair idea of the extent of tanks and vats in the works.

The capital actually employed by the company, exceeds a million of dollars, which, in the face of the fact that they find always ready sale for all they produce, and have no accumulation stock on hand, is quite a desirable investment.

Although Pliny mentions the production of starch on the Island of Chios, and Queen Elizabeth felt rather proud of the greenish yellow starch which stiffened her gorgeous ruffs, it was destined for the nineteenth century, and a little town of the Empire State, to show to the world perfection in this important branch of industry.

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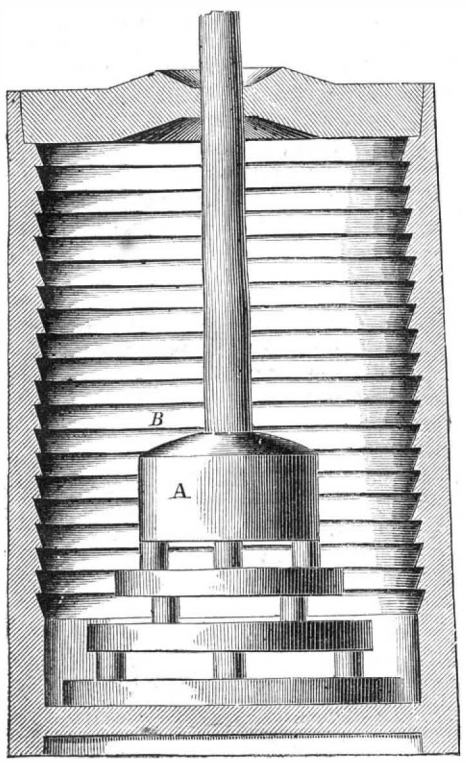
WHITE'S CHURN.

This engraving represents a new churn which would seem to be novel and efficient. In detail it consists of a dasher, A, which is an inverted hollow chamber, inwardly and outwardly of a pyramidical shape, having upon its exterior a series of steps diminishing in area. The walls of this dasher may be either open or pierced with holes for the passage of air and cream



to and fro as it is dashed up and down in the cream. In this way air is carried down with it at each stroke and the cream forcibly ejected through the holes in the dasher against the corrugated interior of the churn.

The interior of the churn is grooved or corrugated, as at B, to increase the friction of the cream thrown against it, and so aids in breaking the sack which contains butter. As the dasher descends, the cream, passing up through the central opening of each ring, is forced against the under surface of the one next above, and forcibly projected, as before, against the walls of the churn. The concussion thus produced has the effect before described.

The cream, in passing from one elevation to another during the ascent of the butter, is also subjected to the same action.

By this apparatus, under favorable circumstances, as regards temperature, etc., the butter may be produced and gathered in from two to five minutes.

An application is pending through the Scientific American Patent Agency by H. W. White, of Olney, Ill. For further information address him at that place.

SPECIAL NOTICES.

William McCord, of Sing Sing, N. Y., has petitioned for the extension of a patent granted to him on the 27th day of July, 1852, for an improvement in soaps.

Parties wishing to oppose the above extension must appear and show cause on the 9th day of July next, at 12 o'clock, M., when the petition will be heard.

Thomas Castor, of Philadelphia, Pa., has petioned for the extension of a patent granted to him on the 3d day of August, 1852, for an improvement in dumping wagons.

Parties wishing to oppose the above extension must appear and show cause on the 16th day of August next, at 12 o'clock, M., when the petition will be heard.

Manufacture of Wafers.

The mode of making the best quality of wafers, as practiced by the English manufacturers, is as follows: Fine wheat flour is taken and mixed with white of eggs and isinglass into a very smooth paste; this is spread over the tin plates evenly, and dried in an oven, several of the plates being placed one over the other to communicate a glossy surface to the wafers. When dry the sheets of paste thus formed are laid up in a pile, about an inch or more in depth, and cut into circular pieces by a hollow punch, which allows the wafers to pass up its tubular cavity and discharge themselves sideways as the cutting proceeds, which is effected with great rapidity. The variety of colors that are ordinarily communicated to wafers, is given to them in the paste, by the usual pigments in the dry powdered state, or previously dissolved in the water employed.

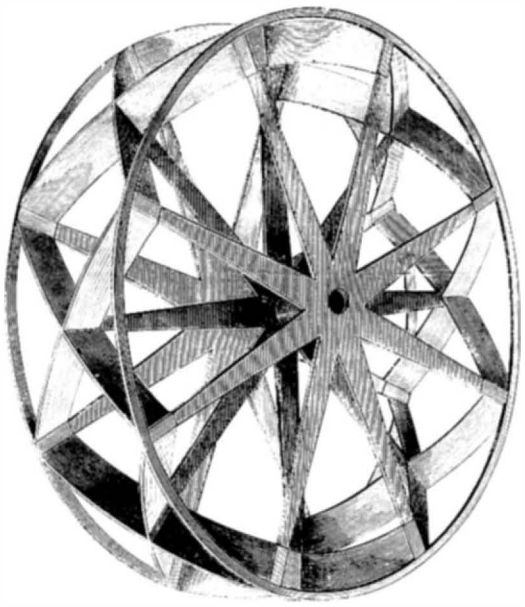
The French isinglass wafers, made in France, are formed of isinglass dissolved in water to the proper consistence, which is poured out upon plates of glass provided with borders, and laid upon a level table; to prevent the blue from sticking to the plates, a little ox gall, or other suitable material, is rubbed over them. Previous to the isinglass becoming quite dry, they are cut through along the borders. The leaves are then removed and cut out with hollow punches, as in the case of other wafers. The various colors are also communicated to them by pigments while in fluid state.

Improved Paddle Wheel.

Paddle wheels of the ordinary kind are objectionable from the quantity of water they raise behind and from the violent shock with which the buckets strike the water. It is argued that by disposing the paddles differently, so that the mechanical action is different, better results will be obtained.

This engraving shows a wheel designed to be more efficient than the ordinary wheel. To this end it has buckets placed diagonally across the face. They thus enter with little or no noise or jar, and leave the water freely, presenting no great areas of surface in a favorable position for raising the water behind.

A wheel constructed like this one is much stronger than the common wheel, requires less bracing, and is therefore lighter and cheaper.



CHOATE'S PADDLE WHEEL.

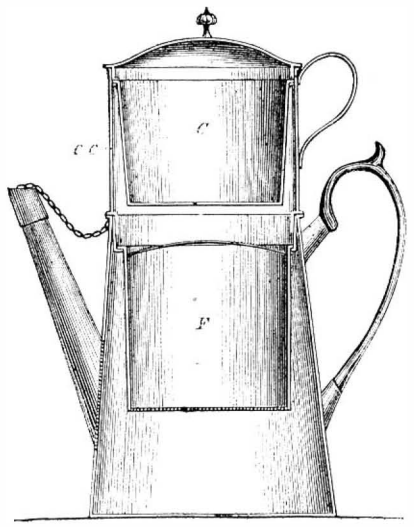
The proprietors and patentees desire to sell State rights or single rights for use on boats. It was patented through the Scientific American Patent Agency on October 10, 1865. Address Wm. Choate & Co., Newburyport, Mass., for further information.

THE BEAUMONT CONDENSING TEA AND COFFEE POT.

The almost universal use of tea and coffee affords a sufficient reason why any device to improve these beverages, or to reduce their cost, should and does command the attention and excite the interest of the public.

The art of making good tea and coffee, and the reason why so few excel in it, are not generally understood. The distinguished chemist, Baron Liebig, in a recent article upon coffee and its preparation, incidentally shows why the object sought is so seldom attained. After speaking of two methods of making coffee, viz, by filtration and infusion, he says of the third: "Boiling, as is the custom in the East, yields excellent coffee," but, "if boiled long, the aromatic parts are volatilized, and the coffee is then rich in extract, but poor in aroma." Here, then, is the root of the whole difficulty—in making either tea or coffee, if the material be steeped or boiled long enough to obtain a large proportion of its extract, its aroma is disengaged or volatilized, and passes away with the vapor arising from the heated liquid.

That method or device, therefore, which shall in the most perfect manner condense and retain the



steam arising from the boiling tea or coffee in preparation for the table, must of necessity be the best method or device.

It is claimed for the article whose name heads this notice, that, in a greater degree than ever before attained, it *does* accomplish this object. With what degree of justice this claim is presented, our readers will be enabled to judge upon examination of the engraving and its accompanying description.

The body is that of an ordinary tea or coffee pot, with a cover or cap upon the spout. The filter, F, is a cup (with bottom of perforated tin) which can be taken out at pleasure, and in which the material is placed for steeping or boiling; this retains the grounds, and, in connection with the condensing principle, makes a clear beverage, without the use of eggs or other clarifying substance.

The condenser, C, is a movable cup, fitted to the top of the pot, to be filled with cold water when in use, formed of two cylinders; the inner one (closed at bottom and forming the cup) being connected with the outer one near the top, the space between the two cylinders forming the coudensing chamber, *c c*, opening into the pot below, and having no other outlet; into this chamber the steam from the boiling liquid rises and is condensed upon the surface of both the inner and outer cylinders, and is thus prevented from escaping, thereby retaining the aroma, which indicates and in part forms the flavor of tea and coffee.

The proprietors claim for this invention great superiority in effectiveness—therefore in economy—on the ground that the condensing surface is much larger than in any other article for a similar purpose, this peculiarity making it highly valuable in the preparation of tea, the aroma of which is so much more delicate and difficult to retain than that of coffee.

It is also, as will be perceived, so simple in construction that it can be as conveniently used, as readily repaired, and as easily cleaned as any ordinary coffee pot.

For further information address the patentee, John Beaumont, Hartford, Conn., or the proprietors, Beaumont & Guernsey, New Britain, Conn.

We would call the attention of manufacturers and mill owners to the advertisement of the Gillespie Governor Co., of Boston, in another column. From the number of excellent testimonials we have seen from parties who have had this Governor in use, we are led to believe it possesses the qualifications the advertisements claim for it.

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SUPPLEMENT.

With the last four issues of the SCIENTIFIC AMERICAN, we have published a four-page supplement, which has been regularly sent to all our mail subscribers, and sufficient copies have been delivered to the American News Company to supply all those who receive their papers through agents. A supplement is also issued with the present number.

TAXING INVENTORS—AN UNJUST MEASURE.

On the 2d of May the House of Representatives was occupied in considering several different reports from the Committee on Patents, to which reference was made in our last number. The proposition of Mr. Chanler to authorize the Secretary of the Interior to appoint three commissioners to attend the Paris Exhibition, to report upon patented machines and inventions, at an expense not to exceed $15,000, the amount to be paid out of the patent fund, was voted down. The subject, however, elicited considerable discussion. A bill was reported by Mr. Hubbard to allow the Commissioner of Patents to examine an application of Philos B. Tyler in reference to an extension of his patent for improved cotton presses. The question was debated by several members, and the bill was laid on the table. Mr. Jenckes reported a bill to pay Assistant Examiners for services rendered by them as Principal Examiners. This service was discharged at a time when the business of the Patent Office had greatly fallen off, and the Commissioner did not—in view of the then low condition of the patent fund—feel justified in raising the grade of service by appointing Principal Examiners to fill vacancies.

The funds now being ample, the Committee on Patents, backed by the indorsement of the Commissioner of Patents, unanimously recommend, as an act of justice, that the Assistant Examiners be paid out of the patent fund for the services actually rendered by them. Mr. Washburne, of Illinois, objects, a discussion ensues, and the bill is laid on the table.

Mr. Jenckes also reported a bill regulating appeals to the Examiners-in-Chief, providing that upon appeal from the Examiner to the Examiners-in-Chief, the appellant shall pay a fee of ten dollars.

Mr. Jenckes briefly argued the merits of the bill, based upon the assumption that the Appeal Board was overloaded with business, and that in view of the increased labor devolved on the Patent Office, there should be an increased fee.

This bill, by far the most objectionable one of the number mentioned, was passed without opposition or debate.

Such is a brief summary of one day's legislation in the House on matters relating to the Patent Office. Out of the surplus fund of the Patent Office, now upwards of $130,000, it was proposed to create a scientific commission of three persons to visit and report upon the great French Exposition, thus adding vastly to the stores of technological science in the Patent Office. Out of the same fund it was also proposed to pay Examiners for services actually performed. Neither of these propositions could receive favorable consideration. No new taxes were to be levied to meet these expenses, and no appropriations from the funds of the Government were called for. The inventors—the applicants for patents—had supplied all the funds that were necessary to meet the expenses proposed, and after these charges were all paid, the Commissioner of Patents would then have upwards of $100,000 surplus to the credit of the fund. When the proposition comes up to tax inventors still higher for the privilege of having their claims properly examined and disposed of, not a single member raises his voice against the unjust measure. There was no squeamishness on the subject. The whole thing was rushed through apparently without consideration on the part of the House. Where was Mr. Washburne at this important juncture, that he did not interpose his usual objection? We fear that he was absent just at the opportune moment, when Mr. Jenckes moved the previous question. Where was Mr. Harding, of Illinois, who was instrumental in breaking down the bill to pay Assistant Examiners by interposing a comparison which was as foreign to the subject as possible—and who was so sensitive about our "grinding and ponderous taxation," and expressed himself in reference to another bill, that he was "unwilling to add another dollar to our obligations unless it be for a measure of great national importance"?

At the time when Judge Mason assumed the duties of Commissioner of Patents, he undertook to hear and decide all cases of appeal. The labor thus self-imposed, though extraordinary, was thoroughly performed. But when Mr. Holt entered upon his duties as Commissioner, he soon found this labor perfectly herculean. It was impossible for him to attend to all appeal cases and discharge the usual functions of his office; and, with a view to relieve himself of such accumulations of labor which no one man could perform, he constituted out of his examining force a temporary Board of Appeals. This arrangement continued until the passage of the amendment act of March 2, 1861, which created a permanent Board of Examiners-in-Chief, to be appointed by the President; to which all appeals were to be taken. According to the last Annual Report of the Commisioner of Patents, 10,664 applications were made for patents in the year 1865, of which number 4,048 were rejected, and only 495 appeals were taken to the Board. We ask Senators and Representatives to consider whether this small number of appeals taken would indicate that many of them could justly be regarded as frivolous?

Let them also consider that for a considerable period of the year 1865 there were two vacancies in the Appeal Board, occasioned by the resignation of Messrs. Coombs and Theaker, leaving Mr. Hodges alone to hear and decide such cases. Is it right that inventors, who do not usually belong to the moneyed classes, should be taxed $4,000 or $5,000 a year additional to have their claims properly adjudicated at the Patent Office?

If this bill passes, applicants for patents, whose claims are rejected, cannot appeal either to the Examiners-in-Chief or to the Commissioner of Patents without paying an extra fee. They are to be charged for appeal from the erroneous decisions made by Examiners

We say there is no justice whatever in such a proposition. If the existing patent fees were insufficient to meet the current expenses of the Office, the argument would be against our position; but as the matter now stands, we cannot but consider the proposition as a flagrant injustice.

Mr. Morrill, in his recent able argument in behalf of the tax bill, spoke energetically against all unnecessary taxation. We all admit, we all feel, the strength of his position. We therefore protest most earnestly against this additional levy of an unnecessary tax upon inventors. They do not need this extra squeeze.

DISINFECTANTS AND THE CHOLERA.

There is a very great demand at the present time for disinfectants; one would think from reading the advertising pages of the newspapers that there is nothing now more needed in every family. The old favorite chloride of lime, since the cholera advent, has been in such request that its price has advanced twenty-five per cent, and there is a probability that its present price will be doubled before the summer is over.

But happily we are not dependent upon chloride of lime; in fact, we may easily dispense with it altogether. The intelligent man who has made up his mind that his premises shall be more tidy, and that he will breathe only the sweet air, will not be required to resort to chloride of lime or any of the high-priced nostrums.

We submit, in the first place, that water, air and fire are excellent disinfectants, which cost very little, and are within the reach of every one. These are the natural remedies, and are almost universally applicable. It is very observable in this city that when these are properly used there is no need of chloride of lime. The better class of houses, containing all the modern improvements, are so constructed, that unless the occupants actually choose otherwise to have it, the air within them cannot be tainted. Everything that is not desirable to have around is at once started on its way, through the sewers to the sea, or up the tall chimneys into the upper air, to be dissipated by the winds. The Croton water and the ventilating chimneys here are the purifiers.

How different it is in and about some of the tenement houses, where everything is reeking with filth and alive with vermin. In front of these houses almost constantly you may find pools of stagnant water and boxes of decaying garbage. A blind man might walk through the streets, following only his nose, and unerringly point out all the places to which pestilence is invited. What these places need are water, air, and fire. One of the wisest acts of our very efficient Board of Health, was the removal, a few days since, of the inmates from one of these pestilence-breeding houses, which they then surrendered to the Fire Department for purification by water.

What our old-fashioned and modern cheap houses need, are better conveniences for washing and ventilation. In a large part of them, there is either imperfect connection with the sewers or none at all, and very few of them have any provision whatever for ventilation. Granted that the people who live in them care very little for cleanliness, would it not be well to so build the houses that cleanliness might be the easiest plan, or at least might be possible?

We have alluded to garbage, meaning by it, the worthless relics of vegetables and meats which of necessity are produced in the kitchen. The very simple and economical way of disposing of much of this, in this city, at least, is to put it into the fire. There is no easier place, and there is no nuisance about it. One would suppose from the quantities of such stuff which lies about the streets, that the fact that it will burn had not been discovered. It might perhaps be well for city councils to discuss the propriety of enacting laws which should require that all combustible garbage be consumed within the same building where it is produced. In the winter time, at least, when fires are constantly burning, everything which cannot be carried away by the sewers, might be burned up.

It is only where water, fire, or ventilation is inapplicable, that special disaffectants should be used. The cases of most importance, in the city, are water closets, which are not properly connected with the

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sewers, and stables. The most available disinfectants for the first, are lime, chloride of lime, or common copperas, either in solution or powder ; there is nothing so cheap as copperas which is at the same time efficient. For stables and similar places where the iron stains from copperas might be objectionable, the bisulphite of lime or soda ought to be furnished at a cheap enough rate.

The question of disinfectants involves the old story about cleanliness ; "cleanliness is next to godliness." If people understand it, they will find as much virtue in the scrubbing brush, the whitewash brush, and soap and water, as in almost anything else.

THE FAILURE OF THE MACHINERY OF THE NEW SCREW FLEET.

The mismanagement of the Chief Engineer of the Navy, to use a mild expression, has long since become proverbial, and the practices of the Bureau is used as a byword in the scientific journals abroad. Some proofs of the incapacity of this man, who has designed the machinery for an entire navy on newfangled theories of his own, condemning the designs of other engineers, have recently been brought to light which the affidavits of a thousand contractors and "experts" in the interest of the Steam Bureau, cannot cover up or gloss over.

It will be remembered by our readers that Mr. Isherwood caused the engines of the U. S. steamer *Pensacola*, designed by E. N. Dickerson, to be removed and replaced with a pair of his own design, even to the most minute detail. These engines have just been tried, and on the short trip from Baltimore—where they were built—to this port, have proved a complete failure.

On this short trial the cylinders were so cut as to require reboring, the crank-pin journals were ruined by the extraordinary heating and consequent cutting, and the "brasses" had to be transported to the machine shop for reboring. The crank pins are now being filed and scraped as near round as it is possible to get them, by relays of the most expert mechanics the navy yard can command. The main bearings are so cut up that it is quite possible it will be necessary to renew them also.

In short, these new engines, planned by Isherwood for the *Pensacola*, in place of those he caused to be condemned and removed, have proved inefficient.

The *Pensacola*, it should be observed, was propelled to New Orleans, and through the ever-memorable passage of the forts which defended that place, with a pair of "condemned engines," while those which the chief of the Steam Bureau has planned to replace them, cannot propel the ship from Baltimore to New York without having repairs put on them which would disgrace an engine which had seen five years' service. It should also be borne in mind that the naval engines were constructed by Hazlehurst & Co., of Baltimore, one of the most careful and successful marine engine building firms in this country, and their construction in each stage was rigidly inspected by an engineer selected by the very man who planned them. If we were called upon to chronicle the fracture of any particular part, it would be difficult; but the defects of these engines are not due to either workmanship or material, but solely to the ignorance of first principles of the man who planned them. If a connecting rod, a crank shaft, or even the cylinder itself, had been fractured, it could easily be accounted for by defective materials; but when we find that on such a short trial, not only on the principal bearings of the engine are so completely worn out and cut to pieces, as to require renewal, but that the main cylinders themselves have to be rebored at enormous expense and great delay, it is very plain that nothing less than the fact that the design is wrong will explain the matter.

Nearly every rule of screw engine construction, as proved by theory and practice, and adopted by all successful builders in the world, has been violated by him who presides over the steam branch of the navy.

Again, if it was simply one more Isherwood engine which has failed, we should pass it with a mere mention, but when it is remembered that *twenty pairs* of engines, on precisely the same plans as those which have just proved their worthlessness in the *Pensacola*, are now in process of construction for the new screw fleet, in the various engine building establishments on the Atlantic coast, it is quite a different matter; for it one of these engines, and that one, too, built by one of the oldest and best establishments in the country, under guarantees which Isherwood squeezed into a contract, and the construction superintended by an inspector of Mr. Isherwood's appointing, who examined every detail with microscopic care before it was put in the engine, fails, it amounts to demonstration that the rest will follow suit.

Furthermore, when it is stated that the contractors, experts and engineers bolster up the worthless structures they are pecuniarily interested in—notwithstanding which the engines stubbornly refuse to violate the laws they were built to defy—one may form a tolerably correct idea of the extent of this failure.

So alarmed was the chief of the Steam Bureau at the result in the *Pensacola*, that he posted in hot haste to New York, not only to push forward "without delay," the tinkering-up of the pioneer engine of the new fleet, but further and of greater importance to have the repairs carried on with the utmost secrecy; and he succeeded so well in the latter direction, that although the rejuvenation of his last exploit has been progressing for some time at the navy yard, it was only a day or two since that we had a chance to look at it—and a sorry spectacle it was.

Of course there is no reason to suppose that this engine will operate any better after it has been put again in the same condition that it was in when it started.

The Isherwood engines of the larger sloops of the *Wampanoag* class, in addition to defects peculiar to themselves, possess all the defects of those just alluded to, increased in proportion to their greater size, hence their failure may be expected to be even greater than that of the *Hassaloo* class, of which the Isherwood machine now in the *Pensacola* is an example.

PERPETUAL MOTION.

In our last issue we gave a letter and a diagram from a correspondent which illustrated a plan for a perpetually moving machine invented by a person in Vermont. The number of people engaged in chasing this mechanical "will o' the wisp" far outnumbers those sanguine mathematicians who have, or are just about to, "after years of toil" square the circle.

Surely any one, who did not wish to be deceived, could see that the machine alluded to at the beginning of this article was impractical. Six balls connected to levers jointed to the periphery of a fly wheel were so attached to each other by cords, that the centrifugal force of the balls generated in revolving the wheel one way would draw in the other balls on the opposite side and thus cause a preponderance of weight which would turn the wheel continually after it was once started. *But*, as our correspondent says, the balls did not fall out as they ought to have done, or at the proper time, and the wheel stood still. Undoubtedly there have been many more plausible schemes than this. An industrious German of our acquaintance after working hard for years accumulated quite a handsome sum to buy a home wherein to pass the winter of his days in peace and quietness. Unfortunately he dreamed one night that he had invented a perpetual motion. He acted on this dream. He bought a foot lathe, set it up in his bed room and worked on it in the intervals before and after his daily task by which he earned his living. He was not a poor mechanic by any means, but a man of first rate abilities, and he made a machine so near to a perpetual motion that he thought the next one with a few alterations would be "the long sought after."

He became so engrossed with this impossibility, that he absented himself from the shop and neglected his work so that he lost his place that he had filled for years. If any one asked him how his machine was getting on, he would answer cheerfully. "Oh, first rate, it runs ten hours now; I am going to put on another fly wheel and a pinion, then it will be done."

Fly wheels and pinions he was continually adding; now gearing the speed up, then letting it down, of course adding just so much labor to the main driving force and getting further and further from his ideal. The machine got so full of fly wheels and pinions at last that he was obliged to shore the floor of the house up lest it should fall into the cellar.

One day the horrid truth came upon him with full force that he was a ruined man; that the more fly wheels he put on the worse he was off, and he fled to that resource of all cowards—rum—and drank himself to a sot.

Those who study this delusion are like travelers lost in the woods. They move in circles, and end where they began.

A force that will generate itself and move another force must be greater than itself; which is contrary to common sense and mathematics.

How many are there at this time floundering on this mechanical "bridge of asses?" How many are there whose minds are full of levers, springs, toggle joints, and balls that only need an impulse to set them in motion to swing through space forever, as the planets swing in their orbits? Not a few; sorrowfully we say not a few, because it is painful to see energies wasted on chimeras when there is so much real work to be done in the world.

TAX FOR EQUALIZING BOUNTIES.

The Secretary of the Treasury, in a letter to David A. Wells, Esq., Chairman of the U. S. Revenue Commission, states that the equalization of soldiers' bounties will require an expenditure on the part of the Government of from two hundred to three hundred millions of dollars. The Secretary wishes to know if the resources of the country can bear this additional debt, which will require an additional annual payment of interest of from fifteen to eighteen millions.

Mr. Wells, whose intimate knowledge of the taxable resources of the country is probably superior to that of any other citizen, replies in a very able letter, that, to meet the financial wants of the Government in the present critical period of our experience, and to guard our future prosperity, require that we borrow no more money—that to make this increased debt would require the re-adjustment of the present system of taxation, and the imposition of taxes upon many articles which would seriously affect the interests of the laboring and producing classes.

It is the purpose of the Government to lay a tax, so far as it is possible, upon articles usually regarded as luxuries, and to exempt such as are regarded as necessary for the wants of the people. This is the true theory, and is the one that has hitherto been urged in the SCIENTIFIC AMERICAN.

We publish in another column the estimated reduction in the internal revenue taxes, as reported to the House of Representatives.

The Locomotive Improved by Practice, not Theory.

Zerah Colburn in his excellent work on the locomotive, now publishing in England, and in this city by John Wiley, 535 Broadway, makes the following sensible remarks:—

It has been a favorite practice with writers upon the locomotive engine to deal with it geometrically and with reference to its dimensions. For the useful purpose of railways, however, even more depends upon the excellence of its structure; and it may be said that the stanchness of the boiler, the hardness of the cylinders and valve faces, the strength of the cylinder fastnings, and the general soundness of the engine as a whole, have really more to do with its successful working than any abstract consideration of "heating surfaces," and many of the quantative refinements so often insisted upon. Even the geometrical accuracy desirable in the valve gear is important rather from what experience has shown than from any precise demonstrable relation to the motion of steam. To this day successful locomotive engineering owes far more to practice than to theory; and it should never be forgotten that the best proportions of locomotive engines, so far as engineers are agreed upon which are best, have been discovered by practical men, with little or no aid from theory, except in so far as theory may in itself be considered as the generalization of successful practice.

Work for Boys.

The *Northern Farmer* gives the following hints which may interest some boys who read the SCIENTIFIC AMERICAN. We think, however, that it is a mistake to set boys at work they don't understand, for they often spoil it and get scolded. The fault in such cases lies with those who gave them the work, for the nature of it ought to be explained before hand. This the paragraph below does :—

"Now is the time for you to do something! We

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don't believe you have all of the currants you want in the summer; if so all you have got to do is to cut short pieces of last year's growth of wood from the bushes, and stick them in the ground where you want them, and they will produce a crop by another season. If you want them to grow in the shape of dwarf trees, cut out all the eyes above and below the ground, except a few near the top; this prevents their sending up shoot from the roots, and they will never grow any more than the one stem. The only objection to this mode of training is that they bear too heavily, and are apt to break down with the weight of the fruit; but you can prevent that by supporting each bush with a stick and twine. Now, this is the way you can raise plenty of this fruit, at but little trouble and no expense. If you have not got any cuttings, you can get them from some of your neighbors, or if you fail there, come to us and we will supply you with pleasure."

Blue Obtained by the Reduction of Chloroxynaphthalic Acid.

An alkaline solution of chloroxynaphtalate of soda is boiled with zinc in impalpable powder. The reduction begins in about twenty minutes, and a pale yellow solu tion results. The liquor is now decanted and ammonia added, which in a few hours changes the color to a beautiful green. After this the solution is neutralized by an acid, which causes the precipitation of brown flocculi. These are collected and washed on a filter, and afterwards dried. When dry the substance appears green, and shows a metallic lustre.

The compound is insoluble in water; it dissolves with a red color in boiling aniline, and gives a green solution with strong sulphuric acid from which water separates it with a violent tint. It dissolves in alcohol with a violet color; the solution diluted with water gives a beautiful blue color, which is turned red by acids. The ammoniacal alcoholic solution is transparent, and appears blue by transmitted light. By reflection it appears red, and looks as holding carmine in suspension. The product fixes itself violet on wool, and may be fixed on cotton by means of albumen.

The dilute alcoholic solution dyes silk blue, and also wool and cotton mordanted with albumen. The bath treated with acid dyes rose color; the dye, in fact, like litmus, is turned red by acids and blue by alkalies.

Sulphureted Hydrogen.

This gas, which for experimental purposes is usually obtained by means of sulphuret of iron, may be procured more conveniently, and in a state of great purity, by the use of sulphuret of calcium. The latter is formed very easily by mixing uncalcined powdered gypsum with one-fourth of its weight of calcined gypsum, and powdered pit coal equal to one-third of the whole of the gypsum used, and working up the mixture to a stiff dough with water; next forming it into pieces four inches long, two wide, and one and a-half thick, sprinkling them with powdered coal, and drying them, then placing them with coke in a wind furnace, and keeping them at a very high temperature for two hours. When cold they will be found externally to consist of oxysulphuret of calcium; but internally of pure peach-colored sulphurate of calcium, which may be broken in pieces about the size of nuts, and preserved in well-stoppered glass bottles. If water is added to these, and then sulphuric acid in small quantities at a time, sulphureted hydrogen is given off with great uniformity.—*Scientific Review.*

Thallium Glass.

M. Lamy finds that thallium is preferable to lead to replace potash. It communicates a yellow color to glass just as sodium gives a green coloration. Thallium glass, it is said, is denser and more refractive than potash glass, and the author believes such glass will be specially applicable for some certain optical purposes, and also for the manufacture of some artificial jewels. The best specimen was obtained with the following proportions:—

Sand	300
Minium	200
Pure carbonate of thallium	335

The mixture fused easily, and formed a perfect homogeneous mass, which had an agreeable and brilliant yellow tint. The density was 4·235, and the refraction index for the yellow ray was 1·71.

An unmanagable criminal in jail at Ravenna, Ohio, was quieted by an injection into his cell of two pounds of chloroform.

Coal Oils and Petroleum.

For the Scientific American.

Coal oil is produced by the distillation of bituminous coal or shale, at low heat, has of late years been largely employed under the name of kerosene for illuminating purposes, but a similar article produced at less cost from petroleum has nearly supplanted it for the same purpose.

Petroleum is the crude oil issuing from springs or artificial wells, and is obtained largely thus in the United States, Canada, and elsewhere, and especially in Rangoon, in Burmah. It may vary in specific gravity from ·800 to ·900, but is usually about ·820; the lowest gravities having usually the highest color, and those found in Canada being darker and more offensive in odor than those in the United States. Petroleum contains the lighter oils volatile at the ordinary temperature of the air, and is therefore unsafe for use in lamps. These with other products are separated by distillation in the following order: naphtha, benzine, kerosene, lubricating oils. Naphtha, kerosoline, etc, are the lightest fluids, which first pass over in distillation at 100° F., the boiling point of petroleum, and have a specific gravity of about ·650.

Benzine, specific gravity 735, comes over from the still after the naphtha upon increasing the heat. This is employed by painters and varnishers as a substitute for spirits of turpentine, and being a powerful solvent is effectual in removing oil and grease from clothing; but, as will hereafter be seen, should not be confounded with benzole, which is the true benzine, although resembling it

Kerosene.—The heat of distillation being yet more increased, kerosene or burning oil is produced. Specific gravity ·790 to ·820. If the foregoing lighter oils have been properly separated, the kerosene now produced will be perfectly safe if burned in a proper lamp, with a closely-fitted burner, permitting no communication between the interior of the lamp and the external.

No coal oil should be used for lamps which gives off inflammable vapors under 100° F. The best specimens will not do so under 130° F. Nor should any be burned which will inflame by a lighted match. The best is of specific gravity not exceeding ·810.

Test, Let a small quantity of oil in a teacup or other vessel be placed in a dish of water near the boiling heat, and the bulb of a thermometer be held in the oil. Then observe at what temperature it first inflames by application of a lighted match. Or without a thermometer, by comparison with a known safe specimen, both being managed in the same way; if the suspected oil is not ignited more readily than the other, it may be deemed equally safe.

Lubricating Oils.—The heavier oils which pass over at a higher heat, after the kerosene, are valuable for lubricating purposes. Or the entire remainder of the contents of the still after separation of the kero sene, is sometimes employed as a lubricating oil, without further distillation.

Remarks.—The products of distillation of petroleum are composed in a great measure of hydrides of alcohol radicals, with either no benzole or minute traces of it only. But those derived from distilling coal or shale, have a smaller proportion of the hydrides and much benzole, toluole, etc. And in the distillation of coal, low heat favors the formation of hydrides, and a high temperature produces more benzole, perhaps by decomposing the hydrides as soon as they are formed.

Benzole, (sometimes called benzine).—This important substance, though it may be produced in other ways, is most readily obtained, as suggested, from coal, and cannot be produced from petroleum. From this is produced nitro-benzole or artificial oil of bitter almonds, from which are formed the celebrated aniline colors now so common.

It may interest the reader to know that the cost of a given amount of light from coal oil is about one-tenth that from sperm oil, or one-fourth that from tallow candles, and no doubt considerably less than that from gas. X.

Appearances of Good and Bad Meat.

Dr. Letheby, in a report on the cattle plague, gives the following characters of good and bad meat, which are especially interesting:—"Good meat is neither of a pale pinkish color nor of a deep purple tint. The former is indicative of disease, and the latter is a sign that the animal has died from natural causes. Good meat has also a marbled appearance from the ramifications of little veins of intercellular fat; and the fat, especially of the internal organs, is hard and suety, and is never wet; whereas that of the diseased meat is soft and watery, often like jelly or sodden parchment. Again, the touch or feel of healthy meat is firm and elastic, and it hardly moistens the fingers; whereas that of diseased meat is soft and wet—in fact, it is often so wet that the serum runs from it, and then it is technically called wet. Good meat has but little odor, and this is not disagreeble; whereas diseased meat smells faint and cadaverous, and it often has the odor of medicine. This is best observed by cutting it and smelling the knife, or by pouring a little warm water upon it. Good meat will bear cooking without shrinking, and without losing very much in weight; but bad meat shrivels up, and it often boils to pieces. All these effects are due to the presence of a large proportion of serum in the meat, and to the relatively large amount of intercellular or gelatinous tissue; for the fat and true muscular substance are to a greater or less extent deficient. If, therefore, 100 grains of the lean or muscular part of good meat are cut up and dried at a temperature of boiling salt water (224° F.), they lose only from 69 to 74 grains of their weight; but if diseased meat is thus treated, it loses from 75 to 80 per cent of its weight. I find that the average loss of weight with sound and good beef is 72·3 per cent, and of mutton 71·5 per cent, whereas the average loss of diseased beef is 76·1 per cent and of diseased mutton 78·2 per cent. Even if it be dried at a higher temperature, as at 266° F. when all the moisture is expelled, and when good meat loses from 74 to 80 per cent of its weight, the proportion of loss in bad meat is equally as great. Other characters, of a more refined nature, will also serve to distingush good from bad meat. The juice or serosity of sound flesh is slightly acid, and it contains an excess of potash salts, chiefly the phosphate; whereas diseased meat, from being infiltrated with the serum of blood, is often alkaline, and the salts of soda, especially chloride and phosphate, abound in it. Lastly, when good meat is examined under the microscope, the fibre is clean and well defined, and free from infusorial creatures; but that of diseased meat is sodden, as if it had been soaked in water, and the transverse markings are indistinct and far apart; beside which, there are often minute organisms like infusorial bodies. These are very perceptible in the flesh of animals affected with the cattle plague, and Dr. Beal has described them as entozoa-like objects. They differ altogether from the parasites which constitute the trichina disease, and the measles of pork. How far the use of diseased meat affects the human constitution is unknown. In those cases where certain parasite diseases exist in animals, there is no doubt of its injurious nature; for the tape-worm, the trichina, and certain hydatid or encysted growths are unquestionably produced by it. Experience also points to the fact that carbuncle and common boils are in some degree referable to the use of the flesh of animals affected with pleuro-pneumonia; and occasionally we witness the most serious diarrhea and prostration of the vital powers after eating diseased meat. It is, therefore, safest to forbid its use; and it is at all times best to guard against the possibility of injury by having meat well cooked. It should be so cooked that the very center of the joint should be exposed for sometime to the temperature of 212° Fahrenheit. The instructions of Liebig in this particular are hardly safe; for although a temperature below that of boiling water may coagulate albumen and develop the flavors of cooked meat, it may not insure the destruction of dangerous parasites. It is therefore better to have the meat a little overcooked than otherwise."—*London Journal of Pharmacy.*

The Pittsburgh *Commercial* says a coal company has now piled near Hornesdale, 350,000 tuns of coal—Said to be the largest body of coal ever collected in one heap on the face of the earth. It would require a train over two hundred and sixty miles in length to remove the stock; 700,000 carts would be needed reaching in one continuous line more than 2,000 miles. This large deposit will give some idea of the magnitude of the coal interests of our State.

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POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening last, May 3d, 1866, the President, Prof. S. D. Tillman, in the chair.

SMOKE-CONSUMING STOVE.

Mr. Cochran presented to the Club a model of a smok-consuming stove, constructed on the principle of Sir Humphrey Davy's safety lamp, a wire gauze of the size known as No. 11 preventing the rapid egress of the products of combustion, which in this manner were forced into longer and more intimate contact with the atmospheric oxygen which finds access through the ash pit, as in common stoves.

At a distance of two inches behind the grate bars a vertical partition of iron rises, between which and the outer shell of the stove the gases of combustion have to rise after passing the wire gauze in the lower part of this partition. The latter has a damper on the top, which is opened when soft coal is burned, when an increased dratt is desirable. In such case, Mr. Cochran remarked, the gases burned entirely and left coke behind, which was afterward slowly consumed, producing considerable heat. A great fuss on the merits of this invention ensued, some thinking it more disadvantageous than otherwise.

ARTESIAN WELL BORER.

Mr. Walter Hyde next exhibited a model of a boring machine, adapted for artesian wells.

A continuous turning motion in one direction as well as the C-shaped drill formed its principal features. The former is accomplished by a swivel, suspended on a log chain. The swivel turns and twists the rope during its descent. As soon as the drill reaches rock, the swivel returns to its original position, and is ready at the next stroke to impart again the twisting motion. Another peculiarity of the same was a small pinion, facilitating the raising the heavy drill with but a small expenditure of force. The largest holes drilled were 4½ to 6 inches in diameter.

MOUNTAINS WEARING AWAY.

Dr. Stevens spoke about the forces active in the formation of our mountains and valleys with special reference to the tract of land extending from New York State through Pennsylvania down to Delaware, of which section he presented charts, showing the Alleghany mountains, the Susquehanna coal fields, from which, according to best evidences, from 6,000 to 15,000 feet in hight had been removed in the course of time.

ROOFING.

The subject of roofing, as selected for the evening, was then taken up. Mr. Robinson presented some samples of paper felt, saturated with coal tar, which was prepared by him in the following manner: He passes two sheets of the paper through a pair of iron rollers, while the surfaces of the paper in contact were fed with the bituminous composition which cemented them together. This double sheet was passed again through a set of rollers, where a third sheet under the same circumstances was cemented to the first two, producing a triple elastic waterproof sheet about one-eighth of an inch thick, which had some advantages over ordinary roofing felting. Among the latter it was stated that common felting made from woven fabrics, was not only more expensive than paper felting, but the pitch in the course of time generally passed through the meshes, exposing the cloth to the destroying influences of atmospheric changes. The paper being dense was impenetrable to the pitch, especially as the successive layers afforded a relative protection to each other. The paper for this purpose was made from the refuse material of paper mills, and answered the purpose as fully as a better grade of paper.

Mr. Robinson's machine could produce a mile of this paper in a day, its width being two feet. The bituminous material used consisted of coal tar or Trinidad pitch, containing sixty per cent of earthy matter, chiefly clay, although lime and fine sand had been used to advantage. In some roofing cements the proportion of earthy matter had been increased to eighty per cent, which rendered it less inflammable.

In using this paper felt it was not necessary to use any gravel, which by its great weight, and in some localities by its scarcity, was found impractical. But it was a good practice to cover the paper with fine sand, although this was not necessary. Heat or cold had but litt e effect upon this paper, it being somewhat elastic, which prevented the bulging up, so frequent with tin roofs in summer, or the cracking of the same material in winter.

The paper has always to be laid upon smooth surfaces. Some attempts to cover damaged shingle roofs with it without removing the shingles, proved failures, the uneven surfaces of the shingles soon tearing the felting.

NEW INVENTIONS.

Organ.—This invention is what may be termed a "composition board," in combination with the keyboard or keyboards of an organ and with suitable buttons or finger pieces, in such a manner that by the aid of said buttons and "composition board," the player is enabled to put on or take off any desired combination of stops, without raising the hand from the keyboard. The composition board consists in a series of longitudinal and transverse slides and elbow levers, arranged in relation to each other and to a series of pneumatic levers connecting with the drawstops of the organ, in such a manner that by the action of each of the transverse slides one or more stops are opened and also one or more closed, and any desired combination of stops can be drawn out or pushed in by a simple pressure of the thumb or finger on one of the buttons or finger pieces. Instead of operating the valves of the pneumatic levers by means of the slides of the composition board, they may also be operated by a pedal which acts on a roller furnished with wipers, which by the intermediate action of suitable forked levers transmit the motion of said rollers to the stops. The pedal is provided with a spring pawl, which can be made to catch in the teeth of a serrated standard, and according to the position of the spring pawl, one or more of the pneumatic levers are brought into or out of action, and one or more drawstops of the organ are drawn out or pushed in. In organs with two or more keyboards, a spring button or finger piece is provided, which connects with a working spring catch and working lever in such a manner that by pressing in said spring button the position of the coupling is reversed; that is to say, when the keyboards are uncoupled, the operation of coupling the same is effected by a simple pressure of said button, and vice versa. Wm. Robjohn, New York City, is the inventor.

Sofa Bedstead.—This invention relates to a new and useful improvement in a sofa bedstead for which Letters Patent were granted bearing date February 21st, 1860. The improvement consists in a modification of the construction of the device, whereby the back surface of the cushion, which is in an elevated position and forms the back outer or rear portion of the back where the device is adjusted for use as a sofa, may be protected by a back board and preserved from abraision and wear. The improvement also consists in a novel arrangement of the seat, cushion, clothes receptacle, and foot board, whereby a much more convenient as well as a neater and more ornamental piece of furniture is obtained. J. F. C. Pickhardt, New York City, is the inventor.

Low Water Detector.—This invention relates to certain improvements on a low water detector known in the trade as Ashcroft's patent Low Water Detector. This detector consists of a tube rising vertically from the boiler and terminating on its top in a spherical air chamber. From this vertical tube extends a horizontal arm which is closed at its outer end and from which rises a steam whistle. The channel leading through this horizontal tube, and forming the communication between the vertical tube and the steam whistle, is closed by a disk of easily fusible metal, and a stop cock in the vertical pipe serves to open and close the communication between the upper portion of said pipe and the steam boiler. By the improvements which form the subject matter of this present invention, the construction of this instrument is considerably simplified, its cost reduced, and its operation improved. G. W. Hewett and J. B. Haley, Cincinnati, Hamilton county, Ohio, are the inventors.

Hand Power Loom.—This invention consists, among other things, in a novel mode of constructing and operating the treadle shaft and the treadles which depress the heddles so as to form the shed at proper intervals of time. The shed is made at the forward movement of the lay, the treadle shaft, through whose revolution the shed is made, being turned by a pawl set on the axle of said shaft, which pawl engages ratchet teeth formed on an end of the shaft, and is moved backward and forward with the lay, thereby rotating the shaft the distance from one rachet tooth to another, and opening the shed in the warp. A Carter and R. Spake, Salem, Henry county, Iowa, are the inventors.

Combing Bristles.—The object of this invention is to prepare a machine for combing bristles and hog's hair. The bristles or hair are clamped in a frame which is reciprocated in a horizon plane so as alternately to approach and recede from reciprocating combs which operate on the bristles and straighten and clean them. The frame that holds the bristles is also capable of being moved to and fro transversely to its regular reciprocating motion, in order to change the position of the mass, with respect to the combs. The extent of the regular reciprocations of the frame can be changed by an adjusting screw without stopping the working of the machine. The combs are two in number and are set opposite to each other in the same vertical plane, being made to approach and recede from each other by means of eccentrics placed on the same shaft that drives the frame in which the bristles are held. The bristles are clamped to their frame by means of an eccentric roller and a movable plate that rests on them. Louis F. Lannay, Indianapolis, Marion Co., Ind., and William F. Parks, Baltimore, Baltimore Co., Md., are the inventors.

Steam Hammer.—First, this invention consists in attaching to the rear end of the hammar helve, by means of any suitable joint, one end of the lever, turning upon a fulcrum, and connected at its opposite end to the piston rod of the engine, so that the upward movement of the piston, within its cylinder, shall thereby raise the outer or hammer of the helve, which then falls not only from its own weight but also aided by the downward movement of the piston, striking and hammering with great force the iron or other metal placed upon the anvil. Second, attaching the lever to the hammer helve, by means of a joint, that will permit of the helve being adjusted with regard to the same, so that its hammer can be set in the proper position to hammer the metal to a level or any other desired shape. Third, connecting the lever or hammer helves or their shafts, with the valve or valves of the piston cylinder, by means of an arrangement of devices, susceptible of adjustment with regard to each other at pleasure, whereby a greater or lesser movement is given to the valves of the piston cylinder, consequently producing a proportionate increase or decrease in the upward movement of the piston within its cylinder, and thus regulating the hight to which the hammer is lifted before falling, as may be deemed desirable or necessary. Edgar L. Kinsley, Cambridge, Middlesex Co., Mass., is the inventor.

An indestructible ink, which would be very useful for some purposes, may be made thus:—Dissolve thirty grains of sugar in thirty grains of water, to which add a few drops of concentrated sulphuric acid. Upon heating this mixture the sugar becomes carbonized by the acid, and when applied to the paper it leaves a coating of carbon which cannot be washed off. This stain is rendered more perfect by the decomposing action of the ink itself upon the paper, and thus it resists the action of chemical agents.

Platinum, being a soft metal, is not fit to receive a sharp edge for any practical purpose, except when subjected to a violent current, which instantly imparts to it a hard temper, similar to that of steel, but this hardness ceases with the current that produces it. At a white heat (1500 deg. Cent.), produced by electricity, a platinum blade will cut the flesh through in an instant, and its action may be regulated at pleasure by modifying the temperature.

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The Tax Bill---Estimated Reductions.

The following is an official statement of the estimated reductions in the Internal Revenue Taxes as reported to the House of Representatives by the Ways and Means Committee:—

Animal Charcoal	$3,000	Productions of stereotypers, electrotypers, lithographers, and engravers	60,000
Alum	5,000	Photographs	25,000
Beeswax	3,000	Plows, cultivators, harrows, straw and hay cutters, planters, seed drills, horse-rakes, and winnowing mills	1,500,000
Barrels, Casks and Boxes	250.000	Paints and colors	50,000
Blooms, slabs, and loops	60.000	Putty	10 000
Boots and shoes	4,400,000	Paraffine oil and crude petroleum	2,100,000
Brass, rolled sheet copper, sheathing, and yellow metal	700,000	Quinine, morphine, etc	12,000
Building stone of all kinds, burr stones and grindstones, monuments, rooting slate, slabs, and tiles	400,000	Repairs	730,000
Brick, draining tiles, and water pipes	282 000	Railroad chairs, ship spikes, axe poles, horseshoes, rivets, horseshoe nails, nuts, washers, bolts, vises, iron chains, anchors, anvils	350,000
Bichromate of potash	30.000	Roman and water cement and lime	144,000
Blue vitriol and copperas	10,000	Starch	100,000
Coffins and burial cases	50 000	Saleratus, soda ash caustic, caustic soda crude soda, bicarbonate of soda, etc	50,000
Crucibles	10,0 0	Soap	33,000
Crates and baskets	15.000	Steel	300.000
Crutches, artificial limbs, eyes, and teeth	25 000	Spelter	10,000
Copper, lead, and tin	40 ,000	Sulphate of barytes	30,000
Clothing	11,600 000	Spindles and castings for locks and machinery	300,000
Feather beds, mattresses, etc	125.000	Stoves, in part of cast iron and sheet iron, or soap-stone	50,000
Fertilizers of all kinds	100,00	Sails, tents, awnings and bags	125,000
Flasks and patterns	5,000	Tin cans	25,000
Gloves and mittens	30,000	Umbrellas and parasols	111,000
Gold leaf and foil	32 000	Vegetable, mineral, and fish oils	600,000
Hulls of ships and other vessels	500,000	Value of bullion used in wares and watches	20.000
Hemp and jute, prepared for textile purposes	25,000	Vinegar	50,000
Hubs, spokes, felloes, handles (wooden) for tools and implements	175,000	White lead and whiting	78,000
Income increased exemption from $600 to $ 000	3,000,000	Yeast powders, yarn and warp	400 000
Income reduction from 10 per cent. to 5 per cent. on sums over $10 000	17,000,000	Licenses	13,000
Iron, advanced beyond pigs, slabs, and loops	400.'00	Naphtha	5,000
Iron, railroad, re-rolled	582.000	Slaughtered animals	1,200 000
Iron, pig	2,000,000	Schedule A	1,359 000
Iron, railroad	426.000	Schedule C (Receipts)	200,000
Iron castings for bridges	100,0 0	Freights	4,850.000
Iron malleable	100,060	Salt	200.000
Keys, actions and strings for musical instruments	125,000	Soap, additional	300 000
Lamps and lanterns	50 000	Steam engines, etc	350 000
Moldings for picture frames, etc	5.000	Tobacco	650.000
Mineral waters, etc	12.5,000	Brokers' sales	500 000
Mineral Coal of all kinds	1.250.000	Savings Banks	50,000
Metallic nickel, quicksilver, manganese, cobalt, etc	12 000	General Tax reduced from 6 to 5 per cent	12,000 000
Metallic zinc	50.000	Telegraphs	125,000
Masts, spars, and ship blocks	45,000		
Oxyd of zinc	60 000		
Paper, books, charts, and book-binding	2,072,000		

UNESTIMATED ARTICLES.

Bristles,	Paintings and statues, and groups of statuary, etc.,
Flavoring Extracts,	Aniline colors,
Deerskins,	Bleaching powders,
Oakum,	Tar, turpentine,
Verdigris,	Candle wicking.
Illuminating gas, educational institutions, etc., etc.,	

Notes and Queries

O. C., of Mass.—To bronze statues make green the following dip or wash. Wine vinegar, 2 qts; verditer green, 2 ozs.; sal ammoniac, 1 oz; salt, 2 oz: alum, ½ oz; French berries, 8 oz; boil all together and apply.

O. F. D. & Co., of Ohio.—You should not ask us to ascertain the relative power of your steam engine and find out what size water wheel will do the same work. Address any civil engineer and pay him a fee for doing it.

J. S., of Ill.—Although the conditions which affect your steam boiler may seem mysterious, depend upon it there is some cause which can be found out by patience. We don't believe in the mystery business. Is it not a change of the wind? Some boilers make steam freely when the wind blows in one direction, while in another they are almost useless. Observe and see If this is so, you can remedy it by resetting the boiler. The scale you send us appears to be a strong alkali. Have you used anything to loosen it?

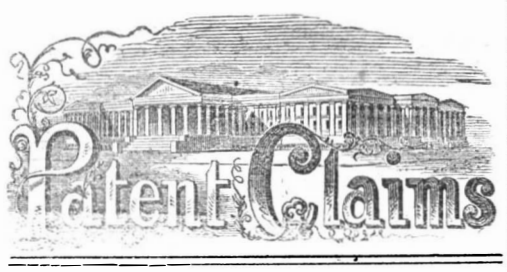
O. N. R., of N. Y.—We know of no way of removing India ink, except by making new flesh, cauterization, burning it with a hot iron will do it, but the result will be a scar.

E. S., of Ohio.—If paper be immersed in a strong solution of chloride of zinc it becomes converted into a species of vegetable parchment which is not easily wetted by water. The solution has a similar effect on cotton cloth, but we have not seen the recipe to which you allude.

D. B. of Bath.:—"Would it be possible to set two iron rollers, with perfect surfaces, so closely together that, by rolling cream between them the membrane containing each globule of butter would be broken, thus requiring a slight stirring to unite the globules into a mass?" Yes. A claim on this principle has been patented.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying We can also furnish a sketch of any patented machine to accompany the claim at a reasonable additional cost. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.



ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING MAY 8, 1866.

Reported Officially for the Scientific American

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

54,479.—Sheep Holder for Shearing.—C. Albert, Harrisville, and J. J. Shank, West Salem, Ohio:

We claim the shaft, C C, arms, d, loops, d', strap, m, in combination with the ratchet plate, F, pawls, b, and table, arranged in the manner and for the purpose set forth.

54,480.—Water Closet Seat.—Louis Alexander, New York City:

I claim the combination seat as constructed of several flaps, a b c d e, etc., with projecting flanges or ribs, in combination with suitable fastenings, g, constructed and operated substantially as and for the purpose set forth.

[This invention relates to the seat of a water closet, which is composed of three or more sections, combined with each other, and with suitable berths or partings, in such a manner that each seat can be unlocked independent of the others, and that by unlocking the second seat, for instance, access is had to this seat alone, and to neither of the others, and thereby a combination seat is obtained, which is of great value, particularly for houses which are occupied by several families, and which gives each family its own seat, without requiring more than one closet.]

54,481.—Propeller.—John F. Allen, New York City:

First, I claim the arrangement of a propeller blade at the end of a vibrating shaft, which gives motion to said propeller blade, when said propeller does move at a regular and fixed pitch, during the whole length of its motion, and is capable of being operated by the action of the water against its surface, at the beginning of each stroke, in such a manner that thereby its forward edge shall always be brought forward to its line of motion independent of the direction in which this motion may be communicated, substantially as described,

Second, I claim the collar, F, with a projection, n, fastened to the propeller, in combination with the worm wheel, J, provided with a projection or stop, m, and operating together in the manner and for the purpose described.

Third, I claim the arrangement of the worm wheel, J, with a suitable stop or projection, m, operated by suitable gearing, for the purpose of regulating and altering the pitch of the propeller blade, substantially as set forth.

Fourth, I claim the arrangement described for changing the pitch of the propeller blade while in motion, so as to make said propeller act at the same time as a rudder for the vessel, substantially as set forth and specified.

54,482.—Scrubber and Tender.—Asa H. Allison, Charlottesville, Ind.:

First, I claim the tender, C, with the trough, D, and strap valve, E, substantially as and for the purposes set forth

Second, The combination of the tender and scrubber, constructed and arranged substantially as and for the purpose set forth.

54,483. Pump.—R. H. Andrews, Elizabethtown, Pa.:

I claim the combination and arrangement of the wheel, d, slide, e, connecting rod, g, and cylinder, h, for the purpose herein set forth.

54,484.—Protecting Pumps in Deep Wells.—Francis Armstrong, Pittsburgh, Pa.:

I claim the cups, a and b, when arranged and operated as, or substantially as and for the purpose set forth.

54,485.—Coupling for Carriage Felloes.—Haines Austin, East Liberty, Ohio:

I claim the combination and arrangement of the tube or box, A, with the conical male screw, C, and blocks, D D, (with semicircular female screws), marking in said box, for the purpose set forth, substantially as described.

54,486.—Grinding Mill.—J. W. Baldwin, Sidney, N. Y.:

I claim the screw, E, or equivalent detachable points, d, combined with the spindle, F, and ball, D, and arranged with the runner, A substantially in the manner as and for the purpose herein set forth.

54,487.—Farm Gate.—A. G. Barnard, Seville, Ohio:

I claim the strip D, and posts, E, in combination with the brace, C, and gate, A, cut out as at b, substantially as and for the purpose set forth.

54,488.—Composition for Gold Size.—Carl Bartholmac, Mew York city:

First, I claim the use of glue in a composition for gold sizing, substantially as and for the purpose described.

Second, A composition made of the ingredients above specified, and mixed together, substantially as and for the purpose set forth.

[This invention relates to a composition which is intended to take the place of the varnish or size generally used in printing such parts of wall paper, or of fancy paper, which are to appear in gold color.]

54,489.—Method of Removing Sand Bars from Rivers.—Edwin Bell, St. Paul, Minn.:

First, I claim the removal of sand bars and similar obstructions in the manner and by the means, substantially as set forth

Second, The wheels, C, having the shovels or prongs attached to the paddles when arranged to operate in combination with the boats or barges, A, as shown and described.

Third, I claim a series of boats or barges provided with the lee boards, B, and arranged to form a channel for the passage of the water for the purpose of controlling or directing the current as, and for the purpose set forth

Fourth, I claim in combination with boats arranged as set forth, the wheel, C, and the cables, c arranged and operating as described, for the purpose of controlling the movements of the boats, as herein set forth.

54,490.—Cage for Hoisting Purposes in Mines.—Henry Berry, Hugo Hochholzer and Frank Denver, Virginia City, Neveda:

First, We claim the adjustable arms, A A, india-rubber springs, K K, or their equivalents, together with the head piece, B pillow, b, and beveled shoulders, L L, in combination with the large arms, F F, and guides, G G, substantially as described for the purposes set forth.

Second We claim the cap, C C, hung on hinges in combination with the braces c' c', and head piece, B, substantially as described and for the purposes set forth.

54,491.—Apparatus for Forcing Air in Carburetting Machines.—J. F. Birchard, Milwaukie, Wis.:

I claim an air feeder open and exposed and constructed and operated, substantially as herein described.

54,492.—Compound Sirup.—Charles Birdsall, Jersey City, N. J.:

I claim the compound sirup, prepared with the materials, and as set forth.

54,493.—Vertical Hand Spinning Machine.—James Blaney, Lowell, Iowa:

I claim the application to the vertical spinner of all the apparatus delineated and shown in Fig. 2, of all accompanying drawings except that part marked x, and called in this specification the clamp.

Also the applicat on to the above-named spinner of all the gearing shown, and delineated in Fig 3 of the accompany ing drawings, except those parts marked h and x, and called in this specification the main wheel and the clamp.

54,494.—Portable Fountain.—Thomas H. Bonham, Elizabethtown, Ohio:

I claim herein as new and of my invention, the arrangement of non-conducting refrigerator A B C reservoir, F, feeder, G g, pan, H and nozzle, I c, the whole forming a portable fountain, substantially as described.

54,495.—Compound Burning Fluid for Illumination.—Horatio B. Brace and William T. Swart, Canandaigua, N. Y.:

We claim a burning fluid for illuminating purposes, composed substantially of the ingredients above described, and in about the proportions herein contemplated.

54,496.—Ladies' Skirt Lifter.—Thomas H. Bradley, St. Louis, Mo.:

I claim a machine to be worn as a belt, for raising and lowering the skirts of ladies dresses with cords and tape, by means of a wheel having a case, axle crank with pulleys and guides attached.

54,497.—Quartz Pulverizing.—Henry A. Breed, Lynn, Mass.:

I claim the construction of rotating disk, f, with the openings, t, in the manner and for the purpose, substantially as described.

Also the letter or cleaners, m, upon the periphery of the wheel, g, substantially as set forth.

54,498.—Broom Head.—Henry Buck, Harrisburg, Pa.:

I claim the arrangement of the bars, C C, perforated as described, and the ends of said bars formed substantially as shown, when used with a sliding adjustable clamp, for the ends of said bars, as and for the purpose specified.

Second, The arrangement of the keeper, D, with the socket, A the trap, B, and the bars, C C, the several parts being constructed and used, as and for the purpose specified.

54,499.—Mode of Preparing Stone for Power Printing.—N. M. Buffinton, Fall River, Mass.:

I claim preparing stone substantially as herein described, so that the drawing, lettering or design upon the same may be used for letter-press printing, and that stereotypes and electrotypes may be produced from the same.

54,500.—Brick Machine.—E. P. H. Capron, Springfield, Ohio:

First, I claim constructing the wings, O, of the pressing wheel, as shown and described, for the purpose of drawing the clay inward, at the same time that it presses it downward into the cells.

Second I claim the roller, a, located in the mouth of the finishing box, T, substantially as shown and described.

Third, In combination with the roller, a, I claim the scraper, m, arranged and operating as set forth.

Fourth, The finishing box, T, provided with the scrapers, c and d, constructed and arranged to operate substantially as set forth.

Fifth, The table, H, having the cells, N, formed therein and provided with the projecting shoulder, r, to support the follower, P, as shown and described.

Sixth, I claim providing the follower, P, with the set screws, j, arranged to operate in connection with the shoulders, r, of the cells, N, as and for the purpose set forth.

Seventh, I claim the track, I, extending only a part of the way around, for raising the brick out of the mold in combination with the revolving table, in which the followers are supported, entirely by the table, while passing under the pug or mill, or cropper for the purpose of reducing the friction and power required to operate the same.

Eighth, I claim constructing the follower, P, with the hinged lid, s, and lever, p, arranged to operate as shown and described.

Ninth, In combination with the follower, P, arranged as described, I claim the roller, n, for depressing the follower and operating the cell, as it passes under the hopper to receive the clay.

[This invention relates to a new and improved brick machine of that class in which a horizontal mold wheel is employed, and it consists in a novel arrangement of a mold wheel, pug mill, and mold-filling device, together with certain means for pressing the clay into the molds, and discharging the molded clay therefrom.]

54,501.—Hand Loom.—A. Carter and R. Spake, Salem, Iowa:

We claim, First, In hand-power looms operating the treadles through a system of slides, R. which are moved by pins or cogs on the treadle shaft, J, substantially as described

Second, We also claim the combination of the rod, G, which extends from the lug, the pawl, H, the shaft, J. armed with pins or cogs, L, and the slides, R, substantially as shown and described.

54,502.—Tea Kettle.—William Caven, Cincinnati, Ohio:

In the described combination with the sockets, C c C, and flanged and perforated lid, D e, I claim the winged rear lug, F G g' g' H, adapted to be secured in place by the ordinary bail, in the manner set forth.

54,503.—Combined Square and Level.—Orril R. Chaplin, Salem, Mass.:

I claim the combination of a movable tongue, B, and beam, C, affixed thereto, with the movable or hinged beam, D, substantially as described.

54,504.—Buckle.—Charles S. Cissna, Burlington, Iowa:

I claim the movable bolt, m, parallel with and in rear of the fixed cross piece, r, to which the tongue, B, is pivoted, all being combined and arranged substantially as shown and described.

54,505.—Scrubbing Brush.—William C. Cleveland, Cambridge, Mass.:

I claim combining with a brush block, one or more flexible rubbers applied and operating in connection with the bristles, substantially as described.

54,506.—Seeding Machine.—J. D. Cochran, Milford, N. H.:

I claim the vibrating hopper, D, placed on the pivoted plate, E, and operated through the medium of the cam, F, and spring, c substantially as and for the purpose set forth

I also claim the oscillating cut-off brush, i, in combination with the vibrating hopper, D, all arranged to operate substantially as and for the purpose specified.

I also claim the adjustable seed-conveying spout, H, substantially as and for the purpose set forth.

I further claim the coverer, J, attached to the rear of the share, I, and having the spring, L, applied to it substantially as shown and described.

[This invention relates to a new and improved machine for planting seed in drills, and it consists in the employment or use of a vibrating hopper, in connection with a cut off fitted on a rock shaft and operated automatically from the hopper. The invention further consists in an adjustable seed-conveying spout and coverer whereby proper furrows may be made to receive the seed, and the latter suitably covered and the earth compacted upon it.]

54,507.—Corn Planter.—J. D. Cochran, N. H.:

I claim the strips, A A', with slide, F, attached and provided with the plates, B B, pivoted together as shown in combination with the hopper, D, provided with the partition, E, the slide and partition being provided with holes, and all arranged to operate substantially as set forth.

The manner of supplemental hopper, H, applied to the strip, A, in combination with the seed hopper, D, and slide, F, substantially as and for the purpose specified.

The plates, J J, in combination with the plates, B B, arranged to

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operate in connection therewith, substantially as and for the purpose set forth.

[This invention relates to a new and improved corn planter of that class which are operated directly by hand and carried by the operator. The object of the invention is to obtain a simple device for the purpose specified, and one which may be manipulated with the greatest facility, sow or distribute a fertilizer with the corn and cover the same perfectly.]

54,508.—Shears.—P. F. Crouch, New York City:

First I claim the blade, e, with a slot or mortise for the fulcrum, g, in combination with the handle, c, shear and handle, b, as set forth, whereby the blade, e, receives an endwise motion to act with a drawing, as specified]

Second, I claim the broad thin blade, a, blade, e, and spring, i, in combination with the handles, b and c, joint and slotted fulcrum, g, for the purposes as set forth.

54,509.—Scale Beam.—H. S. Cushing, Blossburg, Pa.:

I claim the combination of the scale beam, A, the rotary cylinder, B, marked and divided longitudinally and transversely as shown, and the catch H, and ratchet plate, C, for holding the cylinder stationary, substantially as shown and described.

[The object of this invention is to combine with a scale-beam, a means of indicating to the eye, without reckoning, the value of fractions in the weight, as for instance, the value of fractions of a pound, where the pound is the unit of weight.]

54,510.—Apparatus for the Manufacture of Paper Pulp.—John W. Dixon and George Harding, Philadelphia, Pa.:

First, We claim the pulp digester in combination with a lower perforated diaphragm, having a central pulp passage, a circulating tube or tubes, connecting the upper and lower parts of the digester.

Second, The pump digester, in combination with a lower perforated diaphragm, a central pump passage, a circulating tube and pump, to produce a circulation through the mass from bottom to top, or vice versa.

Third, The two valves, D and E, in the pump escape tube for withdrawing a portion of the contents without interfering with the operation with the digester.

Fourth, The charging pipe, S, with its double valve for introducing fresh material without disturbing the operation.

Fifth, We claim the combination of pulp digester, circulating tube and pump, when the fire is applied directly beneath the digester.

Sixth, The continual forcing of fresh liquid below and upwards through the mass to be pulped, in combination with the introduction of the fresh charges of the material into the digester above, whereby the cleaner liquid would always be in contact with the pulp most cooked.

54,511.—Planing Machine.—Joseph Dixon, New York City:

I claim the combination of the cutter head, A, shaft, B, adjustable bed, E, indicator, g f, and adjusting screw, I, substantially in the manner and for the purpose set forth.

[This invention relates to an improved method or device for regulating the vertical set of tongueing and grooving attachments in planing machines, which gives several desirable advantages over the present devices used for that purpose, and consists in fixing the knife-holding head rigidly to its shaft, and supporting the shaft on an adjustable or sliding bed plate, so that the adjustment of the knives or cutters may be made exceptionary and while the machine is in full motion, by adjusting the said bed plate; and which also admits of securing the knife-holding head to its shaft in a fixed manner, so as to be beyond liability of displacement by encountering knots, etc.; and further, allows the matching knives to be promptly removed out of the way when the planer is to be used for "surfacing," by dropping them below the surface of the planing bed.]

54,512.—Quartz Crusher.—M. B. Dodge, New York City:

I claim the combination of the wedges, D, with the boxes, B, of crushing rollers, when arranged to limit the approach of said rollers, as herein described.

[This invention consists in the application of soft wrought-iron plates to the working face of a quartz crusher, in such a manner that if a hammer, chisel, or other rigid substance passes in between the jaws of the crusher, the working faces of the jaws will indent sufficiently to permit such rigid substance to pass without injury to the machine; and furthermore, the soft wrought-iron faces are enabled to hug the lumps of quartz, thus preventing them from slipping, and causing them to be crushed with great rapidity.]

54,513.—Railway Switch.—J. E. P. Doyle, New York City:

First, I claim the combination of the revolving radial arms, I J K L, the revolving cylinder, M N, and the chains, R S T U V W, or their or either of their equivalents, with each other and with the switch, B, substantially as described and for the purpose set forth.

Second, The combination of the revolving cylinder, G, with the revolving signals, G', with the revolving cylinder, M N, or either of, substantially as described, and for the purpose set forth.

Third, The combination of lever, C, and bar, B', with the other with car, A', and with the radial arms, I J K L, substantially as described and for the purpose set forth.

[This invention has for its object to furnish an apparatus by means of which railroad switches and signals may be operated from and by the train while in motion. And it consists in placing near the track revolving posts, provided with extended arms, the said revolving posts being connected by chains with the switch and with the signals. The apparatus is operated by a lever projected from the train, which comes in contact with the extended arms of the revolving posts to arrange the switch as desired in advance of the train, and to rearrange it after the train has passed, the signals being changed by the same operation, so as to show the exact position in which the switch stands.]

54,514.—Table Fork.—Charles A. Dungin, New York City:

I claim as a new and improved article of manufacture in forks, constructed and described as set forth.

54,515.—Machine for Embossing Napkin Rings.—Eli H. Eldridge and Thomas Leach, Taunton, Mass.:

We claim the above described chasing or embossing machine, constructed and arranged substantially as and for the purposes set forth.

54,516.—Sheet-metal Spoon.—James Fallows, Philadelphia, Pa.:

I claim a sheet-metal spoon, having a hollow handle, constructed of a single piece of sheet-metal, substantially as herein described and set forth for the purpose specified.

54,517.—Pepper Box.—James Fallow, Philadelphia, Pa.:

I claim a pepper box for table use, having its perforated cover constructed and applied so as to operate in combination therewith, substantially as and for the purpose described.

54,518.—Tile Mold.—Joseph C. Field, Bufialo, N. Y.:

First, I claim the removable core cylinder, c, in a mould for making tiles or pipes, as set forth and for the purpose specified.

Second, I claim the fixed shoulder on the bottom end of the core cylinder, in combination with the bell-shaped bottom of the outer flask or mod, for the purpose of forming a socket in one end of the tile or pipe, as and for the purposes described.

Third, I claim the use of the circular shoulders or projections on the surface of the stationary base plate, in combination with the cover, with its cross pieces on the top of the core, for the purpose of centering and preserving the requisite distance between the core and the outer flask or mold, in order to obtain a uniform thickness in the walls of the tile or pipe, arranged substantially as described and for the purposes set forth.

Fourth, I claim the use of the cross bars, f and e, and the lever, r r, for the purpose of starting the cylinder core, substantially as described and for the purposes set forth.

Fifth, I claim the adjustable hopper, O O, substantially as described and for the purposes set forth.

Sixth, I claim molding vertically, with an adjustable core, c, and the other means herein described.

54,519.—Gearing for Lathes, etc.—Walter Fitzgerald, Boston, Mass.:

I claim the overhead driving and reversing gearing, constructed and operating substantially as described.

54,520.—Machine for Cutting Wire.—William H. Flinn, Nashua, N. H.:

I claim the application of the cap plate, A, and its perforated cutter or cap plate, D, to the perforated disk, B, substantially in the manner as described, the case under such circumstances operating to support the plate, B, circumferentially.

I also claim the combination and arrangement of the case, A, the cutter plate, B, the cap cutter plate, D, the arm d, and the cam lever, C.

I also claim the arrangement of the gage, E, with the cam lever, the perforated case, A, and the perforated disk, B, provided with an arm, d, or the same and a spring, f, as specified

54,521.—Hernial Truss.—Adolph O. Forsberg.—Cincinnati, Ohio:

I claim the hinged pad, H, having a positive and non-elastic adjustment, substantially as described.

54,522.—Mode of Attaching Cultivator Blades.—G. L. Fountain, New Milford, Ill.:

I claim the offset, B, slot, D, and screw bolt, E, in combination with the standard, C, and blade, A, arranged in the manner and for the purposes substantially as set forth.

54,523.—Rubber Packing.—C. L. Frink, Rockville, Conn.:

I claim a rubber compound made of the ingredients herein specified, for the purposes set forth.

[This invention consists in a compound made of india rubber, sulphur, blacklead, or other suitable material generally used with rubber to give it consistency and to increase its weight; and metal filings, brass filing being used by preference, is made in such a manner that a compound is obtained which is not liable to stick when exposed to a great heat or to steam, and which is particularly fit for packing safety valves, globe valves, or other parts which are exposed to the action of steam, and which, when packed with ordinary rubber, require constant repair.]

54,524.—Hay Spreader.—C. R. Frink, Norwich, N. Y.

First, I claim the metallic brackets, E, attached to the bar, A, and arranged as shown to serve as bearings for the axles, F, of the wheels, G, and also as bearings for the shafts, J L, of the wheels, I, and pinions, K, substantially as and for the purpose set forth.

Second, The arrangement of the sliding bearings, a, brackets E, crank, shafts, L, with levers, N, O, combined and operating in the manner and for the purpose herein specified.

Third, The putting of the forks, R, in boxes Q, placed in the cranks, M, of the shafts, L L, and arranged in such a manner as to admit of the adjustment of the forks nearer to or further from the surface of the ground as may be desired.

[This invention relates to a new and improved device for spreading hay, and it consists in a novel manner of arranging the gearing, and hanging or applying the same to the machine, whereby the spreading forks may be readily thrown in and out of gear when desired, and the machine rendered very strong and durable. The invention also consists in a novel manner of securing the spreading forks to the crank shaft, whereby the former may be readily adjusted higher or lower, so as to work nearer to or further from the surface of the ground, as occasion may require.]

54,525.—Straw Cutter.—Clinton T. Frost, Medfield, Mass.:

I claim the combination of the spring, d, the knives, C, D, the bar, F, and the lever, G, substantially in the manner and to operate as before described.

54,526.—Coal Stove.—William H. Gandey, Lambertville, N. J.:

I claim the fire pot, F, and chamber, G, in combination with the draught passages, H, draught spaces, d, external cylinder, D, and base, A, all arranged substantially in the manner and for the purpose herein set forth.

[The object of this invention is to obtain a stove of simple construction which will consume the smoke, and also radiate a large amount of heat from a given quantity of coal, the invention being applicable to all kind of stoves.]

54,527.—Fruit Gatherer.—Edward Gilliam, Alleghany City, Pa.:

I claim the combination of the basket, A, with the yoke, B, spring, C, and handle, D, constructed, arranged and operating substantially as herein described, and for the purpose set forth.

54,528.—Apparatus for Exterminating Insects.—Edward Gilliam, Alleghany City, Pa.:

I claim the arrangement of the furnace B, bellows, D, pipes, C and G, and lever, e and f, constructed, arranged, and operating substantially as and herein described, and for the purpose set forth.

54,529.—Securing Boxes in Hubs.—William Greenleaf, Terre Haute, Ind.:

I claim the box, B, provided with a screw thread, A, at each end, in combination with the thimbles, E, provided with internal screws, c, to receive the screw threads, a, of the box, and connected to the bands, C D, substantially as and for the purpose herein set forth.

[This invention relates to a new and improved mode of securing metal boxes in the hubs of wheels for vehicles, whereby the box is firmly secured in the hub with the greatest facility, and rendered capable of being readily detached whenever necessary, and at the same time admitting of the spokes being fitted more securely in the hub.]

54,530.—Medical Apparatus for Treating Diseases by Vacuum.—George Hadfield, Cincinnati, Ohio:

First, I claim, in a portable apparatus for treating diseases by exhaustion of the atmosphere, the arrangement of a receiver with a vase, F, the adjustable conical frames, G, and sides, H, and cloak, I, all constructed substantially as and for the purpose set forth.

Second, The arrangement of an air pump, A, with the pipes, C and D, the pipe, E, and a receiver, B, composed of several separable parts, T G H, and cloak, I, all constructed and combined, substantially as and for the purpose set forth.

54,531.—Burglar Alarm.—A. F. Hammond, Houston, Ohio:

I claim the combination of the wire, I, and the lever trigger, C H, with the detent, hammer, and detonating match-lighting arrangements, as described.

54,532.—Heating Stove.—Washington H. Harbaugh, Piqua, Ohio:

I claim, First, The arrangement of parts, the oven, H, door, h, ventage, k, and cap, L, substantially as described, for a convertible cooking and warming, and ventilating stove.

Second, The chamber, H I, ventiducts, J K K', doors, h i, and caps, L k, or their equivalents, for a convertible bakery and ventilating apparatus, as set forth.

Third, The provision of the supplementary shell, E, and its described accessories, as and for the purpose stated.

54,533.—Invalid Bedstead.—Peter W. Hardwick, Wayne County, Indiana:

I claim the independent frame, B, with its counter-balancing attachment.

54,534.—Cultivator.—A. S. Harrison, Clinton, Ill.:

I claim, First, The revolving agitator, with curved and pointed arms, in combination with the double inclined cylindrical hopper bottom, substantially as and for the purpose set forth.

Second, The hinged casing of the seeding wheel, in combination with said wheel, f, as and for the purposes described.

Third, The combination of the wings, w, with the gopher, h, as and for the purposes specified.

54,535.—Grinding Mill.—Edward Harrison, New Haven, Conn.:

I claim providing the faces or grinding surfaces of millstones, metal plates, etc., with grooves or channels, corresponding in position to the furrows required for said surfaces, and having the grooves or channels provided with a filling composed of a material softer than the stone or plate.

54,536.—Neck Tie.—W. H. Hart, Jr., Philadelphia, Pa.:

I claim a cravat holder provided with wings, a a, arms, b b, and slot, m, constructed and operating substantially as described.

[This invention relates to a new and improved holder for cravats, neck-ties, scarfs, and other similar articles of wearing apparel, by means of which they can be readily secured in position upon the neck of the person, and removed therefrom without injuring or soiling the collar in the least degree; said holder being also so formed that it can be readily attached to or detached from the cravat at pleasure.]

54,537.—Improved Mode of Propelling Cars on Railways.—Charles T. Harvey, Tarrytown, N. Y. Antedated April 6, 1666:

I claim, First, The use, in connection with a railway, of one or more series of continuous guide plates independent of (but parallel to the rails) for containing and guiding a propelling rope or chain; said plates having one or more openings between or in them, permitting car connections, and also egress of injurious accumulations, substantially as and for the purposes described.

Second, The combination and use of interior "friction slides" or projections with the aforementioned guide plates, substantially as and for the purpose described.

Third, The combination and use of the "ferrules" (so-called) whether pointed or adjustable, or permanently attached to or with the wire, or other rope or chain, substantially as described.

Fourth, The combination and use of the adjustable "friction rings," (so-called) with the ferrules, and ropes or chains aforementioned, substantially as described.

54,538.—Improved Method of Neutralizing Acid for Sheet Iron.—E. A. Harvey, Wilmington, Delaware:

I claim the process substantially as herein described, for removing or neutralizing the acid used in cleansing sheet iron or other articles by means of an alkaline solution applied under pressure in a close vessel to which rotary or other motion is applied to agitate the articles under treatment.

54,539.—Watch Die.—George Hastings, Waltham, Mass.:

I claim, as my invention, the watch hand die as made of the three pairs of plates, A A B B C C, formed, arranged, and combined, substantially as specified.

54,540.—Oiler.—Charles J. Hauck, Williamsburgh, N. Y.:

I claim an oiler provided with a false bottom, d, protected and supported by the annular lip, c in combination with the spring, e, applied substantially as and for the purposes described.

[This invention consists in the arrangement of a false bottom and spring in combination with an annular lip formed at the inner edge of a hole in the real bottom of an oiler, in such a manner that by said spring the false bottom is held down upon the lip, and the elasticity of said false bottom is thereby preserved; and furthermore, the false bottom is prevented from injury by the lip, and the oiler remains tight and in good working order for a long time.]

54,541.—Knife or Fork Back.—J. B. Hawley, New Haven, Conn.:

I claim the combination of the rack, F, with individual "salt" and "butter", C D, substantially as and for the purpose specified.

54,542.—Optical Instrument.—Laban Heath, Boston, Mass. Antedated, May 1, 1866:

I claim, as a new article of manufacture, the convertible optical instrument herein described, constructed, arranged, and operating substantially as set forth.

54,543.—Mangle or Rolling Press.—August Hermann, New Haven, Conn.:

I claim the mangle or rolling press consisting of a segment, circular box and cover, with a treadle frame and radial bars operated by a circular reciprocating motion substantially in the manner and for the purposes herein described.

54,544.—Low Water Detector.—G. W. Hewitt and J. B. Haley, Cincinnati, Ohio:

I claim a low water detector, constructed as described, as a new article of manufacture.

54,545.—Bed Bottom.—Abner Hitchcock, Wayne, Mich.:

I claim the combination and arrangement of the frames, A and B, the springs, D and D', the beams, C, and the cross wires, E, substantially as and for the purpose set forth.

54,546.—Chair and Walker for Children.—Charles Holtz, Chicago, Ill.:

First, I claim in combination with a child's chair provided with the circular frame, E F, constructed as described, the employment of an annular revolving table, G, substantially as and for the purpose specified.

Second, I claim the combination and arrangement of the circular arm supports, E F, the circular frame, A, and removable seat, C, substantially as and for the purpose set forth

Third, I claim the combination and arrangement of the frame, A, the removable seat, C, the arm supports, E, the removable segment, F, and revolving annular table, G, substantially in the manner and for the purposes shown and described.

54,547.—Saw Set.—James Hopkins, Oxford, New York:

I claim a sliding stirrup, D, substantially as herein described, when combined with the set screw, c, and stop, b, of a saw set, substantially in the manner and for the purpose herein set forth.

54,548.—Apparatus for Measuring Liquids.—Frank H. Houghton, Brooklyn, New York:

I claim the globe, B, with measure marks thereon, the valve and plug, E, and cock, C, with double ports, constructed, combined, and arranged, substantially as and for the purpose specified.

54,549.—Button.—David Howarth, Portland, Maine:

I claim as an improvement upon B. F. Caston's invention, patented August 27, 1860, the spiral wire connected with a button when said piece of wire after insertion into the cloth, is struck or pressed down flat on the inner side of the cloth, all substantially as and for the purpose set forth.

54,550.—Medical Compound.—James V. Hulse, Acra, N. Y.:

I claim the within described medicated compound, made as set forth.

54,551.—Piano Stool.—William A. Ingalls, Chicago, Ill.:

First, I claim the employment of the keys or braces, E, in a piano stool, arranged and operating substantially as and for the purposes set forth.

Second, The combination of an extended standard, A, with an upper joint, C, and a lower joint, D, when applied to a stool having removable legs, substantially as and for the purposes set forth and shown.

Third, The arrangement and combination of the upper lug C, provided with the projection, c, and the lower lug D, provided with the T-shaped or double hooked projection, d, with the corresponding openings and recesses in the column, A, and the key or brace, E, substantially as set forth and specified.

54,552.—Cupola Furnace.—John and Thomas Insull, New Haven, Conn.:

We claim the hollow hoop or belt, C C, with its partition, b b, in combination with the blast pipes, D and E, and their tweers, when the whole is constructed, arranged, and fitted to operate, substantially as herein described.

54,553.—Illuminating Apparatus.—John H. Irwin, Chicago, Ill.:

I claim the combination of the air pipes, B, the oil reservoir, C, and an apparatus for forcing air through said pipes when constructed, arranged, substantially as and for the purpose specified.

54,554.—Manufacture of Elastic Packing.—Nathaniel Jenkins, Boston, Mass.:

I claim the composition above set forth, and its process of manu

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facture substantially as and for the purposes described, disclaiming the vulcanizing of rubber by means of heat and the method of mixing the ingredients otherwise than as applicable to this composition.

54,555.—Mode of Connecting the Joints of Stove Pipes and Water Conductors.—Ezra Johnson, Harmon, Maine:

I claim the application to stove pipes and water conductors of the clasp and bolt as herein described, to secure and make fast the connection, and to secure also the principle of this form of direct attachment and connection by rivet or its equivalent.

54,556.—Fastening for Buttons—Josee Johnson, New York City:

First, I claim the button fastening, a, formed as shown in figures 1, 2, and 3, so as to compel the eye, b, of the button, to be held in the center of the fastening by the contact of the ends of said fastening therewith, as herein set forth.

Second, I also claim in connection with the above said ends, substantially as in the figure 1, so that both ends must be opened in order to liberate a button confined thereby.

54,557.—Water Elevator for Wells.—A. T. Jones, Stamford, Conn.:

First, I claim rotating the drum of a water elevator by means of a cam on the crank shaft acting on a radial moving friction block placed within a box on one end of the drum, constructed and operating substantially as described.

Second, I also claim the finger, J, of the cam, I, in combination with the horn, X, of the friction block, K, for the purpose of arresting the descent of the bucket, substantially as described.

Third, I also claim the socket N, within the box, H, of the drum, in combination with a spring, M, for the purpose of bringing the cam, I, into action against the block, substantially as described.

[This invention relates to water elevators applied in open wells in conjunction with buckets suspended in such wells from a rope or chain. It consists, among other things, in a novel way of making the bails of such buckets; also in a novel way of constructing and operating the parts which rotate the drum, so that the latter can be made to rotate with the shaft, and can be released so as not to be acted on by the shaft, and can also be restrained, as by the action of a brake, from turning under the weight of the bucket.]

54,558.—Water Drawer.—F. H. Jones, Attica, N. Y.:

First, I claim the brake, F, provided with lug, c, for the double purpose of a brake and for holding or securing the drum B, to the shaft, or loosening it at will for the purposes, substantially as described.

Second, I claim the ratchet and pawl when constructed and operated, substantially as herein set forth.

54,559.—Broom Head.—Martin C. Kilgore, Washington, Iowa:

I claim a broom head constructed in two sections, constructed by opening, D, and snake head, E, and having screws and threads, G, and projections, H, constructed, combined and arranged substantially as and for the purposes set forth.

54,560.—Steam Hammer.—Edgar L. Kinsley, Cambridge, Mass.:

First, I claim raising the hammer by means of a lever operating upon the rear ends of the hammer helve, and connected with the piston of the steam cylinder, arranged and operating substantially in the manner and for the purpose described.

Second, The stud, M, operating in combination with the helve, f, lever, l, and piston rod, p, and operating in the manner and for the purpose herein specified.

Third, The arrangement of the cam groove, d, arm, s, as applied to the valve of a steam engine and rod, v, and connecting said arm with the lifting lever or beam, l, or any part moving in unison therewith, substantially as herein described, for the purpose specified.

54,561.—Machines for Making Paper Collars.—Henry F. Knapp, New York City:

First, I claim operating the feed rolls by means a ratchet wheel on one of the rolls, and a pawl actuated by the platen which carries the reciprocating cutters, substantially as herein specified.

Second, The combination of the angular edged adjustable cutters, I I, with knives, j j, attached to a removable bar, J, and operating to shear off the waste and form the ends of collars, substantially as herein set forth.

Third, The projection, h, formed upon the reciprocating cutter, G and operating to prevent the said knife from striking or riding upon the stationary knife, H, substantially as herein set forth, for the purpose specified.

Fourth, The arrangement of the feed rolls, E F, cutters, I I and j j, and cutters, G and H, in relation with each other and the bed, A, and platen, B, substantially as and for the purpose herein specified.

54,562.—Tweer.—John Krugbaum, Milton, Ohio:

First, I claim the piece, A, with its pipes, e constructed substantially as described and for the purpose specified.

Second, The combination of the piece, C, with the piece A, substantially as described and for the purpose set forth.

Third, The part, B, with its pipe, f, and slide, g, in combination with the piece, A, substantially as described and for the purpose specified.

Fourth, The thimble, D, and arm, to support the part, C, substantially as described.

54,563.—Railroad Axle Box.—John G. Lahaye, Reading, Penn.:

First, I claim the combination of an axle box, having an oil chamber at the under side and an opening, t, when the said opening is arranged in front of the axle, and is surmounted by a flange, t, as and for the purpose described.

Second, The passage, n, in communicating with the chamber, p, and so situated that its upper end can be closed by the lid, H.

54,564.—Machine for Combing Bristles.—Louis F. Lannay, Indianapolis, and William F. Parks, Baltimore, Md.:

First, We claim the reciprocating table, F, for carrying the bristles or hog's hair to be operated on, in combination with the eccentric, a, and the nut and screw which regulates the extent of the reciprocations produced by the eccentric, substantially as described.

Second, We also claim the devices for holding the bristles, arranged and combined as shown, to wit, the plates, L, the loose plate M, both having pins I, as shown, and the eccentric roller, M, for clamping the bristles between said plates, substantially as described.

Third, We also claim so making and arranging the plate, L, as that is capable of being moved transversely, lever, L2, substantially as described.

Fourth, We also claim the reciprocating combs, U V, moved from the same shaft in combination with the reciprocating table, F, substantially as described.

54,565.—Rotary Pump.—Henry Bedell Leach, Boston, Mass.:

First, I claim one or more inclined spiral scoops, E, revolving in a shell or "casing," A, substantially in the manner and for the purpose set forth.

Second, I also claim the self-compensating balanced abutment, F, the curvatures of one of its surfaces corresponding to and coming in contact with the outer surface of the scoop, E, and drum, B, while the curvature of its opposite surface coincides and comes in contact with the surface of the recess, y, provided for it in the "casing," A, for the purpose set forth.

Third, I also claim the abutment, F, or its equivalent, when used in combination with one or more inclined spiral scoops, E, for producing behind the scoop or scoops a vacuum or partial vacuum.

Fourth, I also claim gradually decreasing the size of the spiral water way or ways, substantially as and for the purpose set forth.

Fifth, I also claim revolving the drum, B, by the revolution of the screw cylinder C and scoop, E, for the purpose set forth.

Sixth, I also claim the segments, G H, as arranged between the scoop, E, and drum, B.

Seventh, I also claim a rotary pump consisting essentially of one or more spiral inclined scoops, E, revolving drum, B, segments, G H, abutment, F, and shell or casing, A, substantially as described.

54,566.—Oyster Cracker.—William P. Lyons, Portchester, N. Y.:

I claim the combination of the casing, A, lever handle, B, arm, G, terminating in a jaw, J, fixed jaw, K, of casing, A, when connected together, and arranged as and for the purposes described.

54,567.—Bed Bottom.—John Lynn and Jackson R. Crowell, Seneca Falls, N. Y.:

We claim the combination of the hook, C, double hook D, clasp, E, elastic band, F, and shield, G, when made substantially as specified, and applied as herein set forth.

54,568.—Apparatus for Treating Green Hides.—Lewis Mackey, Dunmore, Pa.:

I claim the wheel, D, in combination with the tan vat, said wheel being constructed substantially as described, that is to say, so constructed that the hides hang from the outside of the wheel and as the wheel revolves are alternately immersed in the tanning liquor and exposed to the air, substantially as described and for the purpose set forth.

54,569.—Regulating Attachment for Gas Burners.—William Mallerd, Bridgeport, Conn.:

First, I claim the click, N, or its equivalent, in combination with the regulating cap, D, and with the notches, l, or their equivalents, constructed and operating substantially as and for the purpose described.

Second, The cup-shaped depression, e, in the bottom end of the screw f, in combination with the diaphragm, b, gas chamber, B, and burner, C, constructed and operating substantially as and for the purpose set forth.

Third, The secondary gas chamber, g, formed between the cap, D, and chamber, B, in combination with any burner or burners, substantially as and for the purpose described.

[This invention consists in the arrangement of a regulating cap and notched disk in combination with a suitable spring stop or click and with a gas burner, in such a manner that by said click and disk the cap can be adjusted to the number of feet to be burned per hour, said click being so arranged that this regulating can be effected in the dark by the sense of feeling.]

54,570.—Sad Iron.—Charles J. Mallon, Schoharie, N. Y.:

First, I claim attaching the handle, C, carrying a suspended shield to the standard B, by means of the button, E, pivoted to the under side thereof, in the manner and for the purpose herein specified.

Second, I claim the combination and arrangement of the handle, C, standards, B, arms, c, button, E, shield, D, and body, A, constructed and operating in the manner and for the purpose herein specified.

[This invention relates to a novel mode of attaching the handle of a sad iron which has suspended from it a shield for protecting the hand against the heat radiating from the iron, to standards or arms secured to the body of the iron, whereby the handle and shield may be detached from one iron and quickly attached to another, and with little or no difficulty.]

54,571.—Leather Splitting Machine.—Jeremiah A. Marden, Newburyport, Mass.:

I claim the shaft, J, in combination with the sectional rolls, K, the shaft driving the rolls by means of teeth and one or more grooves substantially as described.

I also claim the guide, Q, substantially as and for the purpose set forth.

54,572.—Tool for Holding Glass Bottles.—Edward McArdle, Cambridge, Mass.:

I claim the combination of the jaws, A, slotted plate, B, screw, D, and stock, C, all constructed and arranged substantially as described.

54,573.—Car Brake.—Samuel McCambridge, Philadelphia, Pa.:

I claim the combination of a continuous chain with the brake levers of a train of cars by means of the intermediate levers, G, and the sheave, f and g, the said parts being arranged and operating substantially upon the principle and in the manner hereinbefore described and for the purpose specified.

54,574.—Attaching Thills to Vehicles.—Francis McCoy, West Philadelphia, Pa.:

I claim the yoke, E, with one end curved upward, forming a concave bed, E', for the head, A, of the shaft between the ears, B, of the band or clip, F, constructed and applied in the manner and for the purpose specified.

54,575.—Flour Sifter.—William C. McGill, Cincinnati, Ohio:

I claim in the described combination with the box or case, A, and sieve, B, the scraper, G g G' g' springs, F, elastic arm, E, shaft, C, and crank, c, arranged and operating substantially as and for the purposes herein set forth.

54,576.—Washing Machine.—Stephen McNamara, Chicago, Ill:

First, I claim the employment of two disks of conical rollers, arranged and operating substantially as herein shown and described and for the purposes specified.

Second, I claim the combination of the two disks of rollers, P Q, the shaft, D, and the bevel wheels, H I J, or their equivalents, arranged and operating substantially as described and shown.

Third, I claim in combination with the above, the arrangement of the vertically adjustable frame, c, operating as and for the purpose described.

Fourth, I claim in combination with the above, the employment of the tub, A, and stationary frame, B, arranged as and for the purposes specified.

54,577.—Sewing Machine.—F. L. Melone, Granville, Ohio:

First, I claim the cam shaft, E, placed vertically beneath the bed of the machine with its cams, G and G' and its band wheel, H, and its crank for operating the connecting rod, F, which drives the reciprocating shuttle, all substantially as described.

Second, I also claim locking the presser bar to its proper position for work, by means of the spring bolt, B, constructed and applied, substantially as described.

Third, I also claim feeding the material in sewing machines by means of a feed wheel working on a slide beneath the cloth bed and having reciprocating motion in horizontal directions, the same being locked so as not to rotate when moved forward to give the feed, but being allowed to rotate so as not to carry the cloth back when it is returned to its former position, substantially as described.

54,578.—Washing Machine.—Benjamin F. Miller, New York City:

First, I claim the fingers, g, in combination with the box, a, mounted, as set forth for the purposes and substantially as specified.

Second, In combination with the box, a, mounted as specified, I claim the flanges, h, for the purposes and as set forth.

54,579.—Water Wheel.—Isaac Miner and D. J. Miner, Freehold, N. J.:

We claim the arrangement of the wheels, A A' A'', placed within the curbs, B B', B'', communication passages, a a', supply passages, b b' b'', gates, c c c, discharge openings, d d' d'', gates, e e e, and penstock, C, relatively to each other, and operating in the manner and for the purpose herein specified.

[This invention consists in the employment or use of a plurality of wheels placed within curbs or cases arranged with gates in such a manner that altogether wheels may be acted upon by the same volume of water, the latter passing successively through the several curbs or cases, or any one or more of the wheels less than the whole number acted upon, as may be desired. The object of the invention is to obtain a greater amount of power from a given quantity than has been obtained.]

54,580.—Apparatus for Punching Corrugated Metal.—Mary Jane Montgomery, New York City:

I claim the apparatus for punching bolt or rivet holes in corrugated or curved metals, constructed and operating substantially as described.

54,581.—Rotary Pump.—John J. Morris, Cincinnati, Ohio:

First, I claim the tapering tongue, A', forming part of the cylinder in the described combination with a set screw, F, or its equivalent, substantially as described.

Second, The connecting pin or pins, I or mechanical equivalent, and coiled spring or springs, J, as described and for the purposes specified.

54,582.—Horse Rake.—Washington Mosher, Pittstown, N. Y.:

I claim the bars, E E, pivoted to the front ends of the handles, D D, in combination with the springs, F, and the bars, G G, on the rake head, substantially as and for the purpose set forth.

54,583.—Churn.—Horace Mott, Bellevue, Mich.:

I claim the rocking churn box, the sliding dasher gates, and the handles, arranged and used as and for the purpose specified.

54,584.—Shingling Gage.—E. P. Newbanks, Lincoln, Ill.:

I claim the shingle gage herein described, being composed of the frame, A, adjustable bar, B, and straps, E E, constructed and used as and for the purpose set forth.

54,585.—Attachment for Sleeves and Leggings.—John K. O'Neil, Kingston, N. Y.:

I claim the attachment for sleeves and legs of garments provided with the elastic cord, or braid, c, and the elastic or shirred strips, b b, substantially as and for the purposes specified.

54,586.—Process in Refining Sulphur.—Robert Oxland, San Francisco, Cal.:

I claim the use of chemical agents in the manner hereinbefore described either in substitution of the ordinary process of sublimation for refining sulphur or as supplementary thereto, for the completion of the refining operation.

54,587.—Preparation of Leather.—Moses W. Page, Franklin, N. H.:

I claim buffing the grain side instead of shaving the flesh side of the butt or thick portion of the leather, substantially as and for the purpose set forth.

54,588.—Process of Tanning.—Moses W. Page, Franklin, N. H.:

I claim the within described process of tanning leather, substantially as set forth.

54,589.—Gearing.—S. W. Palmer and J. F. Palmer, Auburn, N. Y.:

We claim an improved gearing consisting of two or more disks or circular plates having teeth or cogs on their faces, so constructed and arranged that there may be two or more sets of teeth or cogs on each shaft to operate in transmitting motion from one shaft to another when said shafts are at a varying distance apart, substantially as herein described, and for the purpose set forth.

[This invention has for its object to furnish a gearing for transmitting motion from one shaft to another, when the said shafts operate at varying distances from each other, as in the case of clothes wringers, planing machines, etc., and it consists in attaching to the sides of the gear wheels, cogs formed in such a way that they will operate equally well upon each other when the shafts are at various distances apart. This gearing was illustrated in connection with Palmer's combined wringer and mangle, in No. 2, Vol XIV. of this paper.]

54,590.—Method of Constructing Cast Iron Apparatus for Superheating Steam.—C. C. Parsons, Boston, Mass.:

I claim a steam superheater having a construction, substantially as described.

54,591.—Preparing Wisps for Brooms.—John E. Phillips, Philadelphia, Pa. Antedated Jan. 11, 1866:

I claim the herein described new article of manufacture consisting of a wisp for filling broom heads or clamps, constructed in the manner and retained in form by the means herein described or any equivalent means, substantially as set forth.

54,592.—Sofa Bedstead.—J. F. C. Pickhardt, New York City:

First, I claim the attaching of the cushion, D, by hinges, b, to a cross bar, C, of the side pieces, A A, in combination with the back board, C, and the cushion, E, attached by hinges, c to D, substantially as and for the purpose specified.

Second, The foot board, J, attached by hinges, i to a cross bar, d, of the posts, c c, in such a manner as to admit of the foot board being folded downward and inward to be covered by the seat cushion when the device is used as a sofa, substantially as described.

Third, The clothes receptacle, I, connected by hinges, f, to the underside of the seat cushion, H, and arranged to work or rest upon the front pair of slides, G, substantially as and for the purpose set forth.

Fourth, The pillow, K, in combination with the cushions, D E, and cap piece, L, arranged substantially as and for the purpose specified.

54,593.—Universal Index.—Martin L. Powell, New Castle, Ind. Antedated May 1st, 1866:

I claim the construction, arrangement and combination of the movable and independent spring indexes, E, operating between the partitions, K, on each side of the plate, A, against the wings, J, as herein described and for the purposes set forth.

54,594.—Fruit Basket.—David H. Priest, Watertown, Mass.:

I claim a fruit gatherer or basket, constructed substantially as and for the purposes above set forth.

54,595.—Mosquito Guard for Bedsteads.—A. D. Puffer, Somerville, Mass.:

I claim the arrangement of the netting over the bars, or stretched bows, and so as to be distended by them around the head, a loose fringe or border of netting pending from the lower bar, and the frame being attached to the headboard of the bedstead, substantially as shown and described.

54,596.—Gate.—C. Purdy, Bedford, Ohio:

First, I claim centrally hanging the swing gate, B, to the laterally sliding gate, A, when constructed so as to operate conjointly as and for the purpose set forth.

Second, The sectional gate, A, in combination with the swinging section, B, catch, L, rod, I, and slats, g, in the manner substantially as and for the purpose set forth.

54,597.—Machine for Stirring and Dissolving Sugar in Sugar Refineries.—Thomas H. Quick, New York City:

I claim the combination and arrangement of the vibrating agitating blade, D, with the heater, A, and engine, E, substantially as herein set forth, and for the purpose specified.

54,598.—Sewer.—Theodore F. Randolph, Cincinnati, Ohio:

I claim the arrangement, in the catch basin of sewers, of movable receptacles, F F', formed and adapted to operate substantially as set forth.

54,599.—Machinery for Folding Tin.—Chas. H. Raymond Woodstock, Vt.:

I claim the combination of the same, and the cam, m, and flange, l, or equivalent mechanism, for effecting the elevation of the cap up to the level of the top of the upper jaw, under circumstances and for the purpose, substantially as specified.

54,600.—Breech-Loading Fire-arm.—Henry Reynolds New Haven, Conn.:

I claim the arrangement of the cover, H, projecting piece, I, lug, f, hammer, C, in combination with the barrel, A, with its slot, F', and operating in the manner and for the purpose herein specified.

54,601.—Hat Block.—H. A. Robison, Cleveland, Ohio:

I claim making the forming block, C, of shell-like construction, fitting upon a core, c, and operating conjointly with said core, as and for the purpose set forth.

54,602.—Sewing Machine Braid Guide.—Thomas Robjohn, New York City. Antedated April 27, 1866:

I claim the combination of the toothed and recessed guide wheels, f f, in combination with the guide tube, d, or its equivalent, substantially as and for the purpose herein specified.

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54,603.—Organ.—William Robjohn, New York City:

First, The composition board, E, constructed of a series of longitudinal slides, g g' g", and a series of transverse sides, n n' n", etc, when the same is applied in combination with buttons or finger pieces, q q1 q2, etc. and with pneumatic levers, B B' B", etc., substantially in the manner and for the purpose described.

Second, The use of an ordinary slide valve, D, of that class commonly known as D valves, in combination with the two parts, a a', of a pneumatic lever, and with rods, c, connecting said parts, substantially as and for the purpose set forth.

Third, The spring pawl, w, and serrated standard, n, in combination with the treadle, h2, pedal, F, and with the slides, g g' g", etc., which serve to impart motion to the draw stops of an organ, substantially as and for the purpose described.

Fourth, The roller, G, with wipers, t-t1 t2, etc., spring, s, and strap, r, in combination with the pedal, F, levers, u u' u", etc., and slides, g g' g", etc., substantially as and for the purpose set forth.

Fifth, The oscillating spring-dog, b2, and button or finger piece, 2, in combination with the mechanism which serves to couple and uncouple, the several key boards, A A, etc. constructed and operating substantially as and for the purpose described.

54,604.—Tooth Brush.—Charles Rosefield, Washington, D. C.:

First I claim the two brushes, A and B, connected and used substantially as herein set forth, for the purpose of cleansing the teeth upon both sides at one operation, as specified.

Second, In combination therewith, the handle, D, pivoted to the brush, substantially as and for the purpose specified.

54,605.—Machine for Rolling Spikes.—Ambler J. Rogers. Kittaning, Pa.:

I claim the combination of the roll, C, with the table, D, said roll and table being constructed, arranged, and operating in the manner substantially as herein described, and for the purpose set forth.

54,606.—File Cutting Machine.—John Rotherham and Joseph Holden, Middletown, N. Y.:

First, Giving to the chisel, F, a backward motion, in imitation to the hand cut, by means substantially such as herein described, for the purpose set forth.

Second, The swiveled roller, n, applied in combination with the arms, E, chisels, F, and anvil, B, all constructed and arranged substantially as and for the purpose set forth.

54,607.—Paper Neck Tie.—James Sangster and Oran W. Seely, Buffalo, N. Y.:

First, We claim the bow made of the parts, B and E, and folded, substantially as described.

Second, In combination therewith, the elastic band, A, as shown and described.

54,608.—Sawing Machine.—Anton Saur and Albert B. Colton, Franklin, Ind.:

First, I claim the guide, I, formed as described, when attached permanently to the end of the counter bar, E, substantially in the manner and for the purpose set forth.

Second, I claim raising and lowering the counter bar, E, and saw, K, by means of a toggle joint, M, and hand lever, L, the whole being arranged to operate substantially as set forth.

Third, I claim the combination or the brake, O, rod, N, and lever, L with the toggle joint, M, for the purpose of bringing the brake, O, into action on the fly wheel, by the same movement that raises the saw, substantially in the manner set forth.

54,609.—Flour and Meal Sifter.—Elijah H. Sears, Crystal Lake, Ill.:

I claim the arrangement of the drawer, C, and the notched pieces, D, lever, H, drawer, B, and frame, A, constructed and operating in the manner and for the purpose herein specified.

54,610.—Brick Machine.—D. W. Seely and F. Jacobie, Albany, N. Y.:

First, We claim a horizontal, or nearly horizontal, feeding and grinding shaft, with knives or blades of a screw form, so arranged relatively that they force the clay or other material from both ends of the machine into the press box, notwithstanding the clay is only introduced into the grinding box at one end, substantially as described.

Second, The combination of a shaft, with right and left screw blades or knives, and a brick molding press, substantially as set forth.

Third, The means, substantially as herein described, for retaining the filled molds under pressure, and while under pressure, forcing them out from under the press box, for the purpose set forth.

Fourth, Retaining the pressure on the filled molds during their removal from under the press box, by means substantially set forth.

Fifth, The means, substantially as herein described, for keeping the molds up to the bottom of the press box and allowing the molds to descend, clear of an obstruction, as they pass under the front part of the press box, as set forth.

Sixth, The slotted and perforated stem of the press follower, in combination with the link and walking beam, substantially as and for the purpose described.

54,611.—Harvester.—John F. Sieberling, Doylestown, Ohio:

I claim the arrangement and combination with the broad flanged clutch, J, of the shaft lever, G, pin, p, and spring, E, or their equivalents, substantially in the manner and for the purposes set forth.

54,612.—Knife Cleaner.—Andrew J. Sellon, Boston, Mass.:

I claim the knife cleaner composed of the elastic roller, the covered tablet, and the groove thereof, such tablet being provided with a handle, as specified.

I also claim the combination and arrangement of the abutment with the tablet and the elastic roller, arranged as specified.

54,613.—Spittoon for Railroad Cars.—J. H. Seymour, Hagerstown, Md.:

I claim the combination of the bowl, A, cover, C, valve, D, lever, f, and rod, E, arranged in connection with the floor of the car, substantially as herein described.

54,614.—Fruit Box.—James Shepard and B. B. Lewis, Bristol, Conn.:

We claim cutting the blank for a box obliquely with the grain of their wood or a veneer, substantially as and for the purpose herein specified.

54,615.—Pressure Head for Siphon and Force Pumps.—Delle Shapley, St. Louis, Mo.:

First, The combination and arrangement of the feed pipe, D, and the annular valve, E, as herein set forth.

Second, The valve, E, in connection with the valve rods, F and c, or their equivalents, and with the chamber, A, when used as herein before set forth

Third, The check valve, K, in connection with the valve, E, as herein before set forth.

54,616.—Blacking for Harness.—Samuel Sherwood, New York City:

I claim the water-proof blacking composed of the ingredients herein specified in about the proportions set forth.

54,617.—Glass Blower Mold.—Oliver P. Sheirkle, Covington, Ky.:

First, I claim a mold for forming jars, etc., with channeled tops, having a downwardly opening bottom, two horizontally opening side parts, and two crease parts which open parallel with, but subsequently to said side parts, substantially as and for the purpose set forth.

Second, The arrangement of parts substantially as described, for the automatic opening first of the bottom and side parts, and subsequently of the crease parts, and for their simultaneous closure by the foot of the blowman or otherwise.

54,618. Shutter Hinge.—Joseph Slusser, Cincinnati, Ohio:

I claim the self-locking shutter hinges provided with the V-indented half collar, B C D, and locking edge, C, on its lower member, and one V-tooth, E, on its upper member, constructed and arranged as set forth.

54,619. Teeth of Machine for Picking Cotton.—Benjamin M. Smith, Brooklyn, N Y.:

I claim the construction of the teeth of machinery, for picking, growing or opening cotton or other fibrous material with grooves or notches, substantially as herein specified.

54,620.—Fastening Handles to Plated Ware.—Henry G. Smith and E. Merier Pomeroy, West Meriden, Conn.:

We claim attaching handles and other projecting parts to cups, pitchers and other analogous vessels made of plated or solid metal by means of male and female screws when the screws are made and fitted in the manner, and for the purpose substantially as herein described and set forth.

54,621.—Machine for Spinning Metal.—Charles F. Spaulding, St. Johnsburgh, Vt.:

I claim the combination of the rotary die wheel, A, and the plate fastening ring, E, and devices for holding it to the wheel with the slide mandrel, G, its spinning wheel or wheels and mechanism for supporting and moving such mandrel longitudinally or toward and away from the die wheel, as specified.

And in combination therewith I claim a mechanism for effecting the vertical adjustment of the mandrel as specified. I also claim the holding ring, E, as made with the fastening arms extending from it as and for the purpose set forth.

I also claim the combination of the clamp ring, F, with the holding ring, E, the die wheel, A, and the mandrel, G, and its spinning wheel.

54,622.—Washing Machine.—M. W. Staples, Saratoga Springs, N. Y.:

First, I claim the upright cylindrical revolving tub, C, constructed as described, in combination with the stationary tub, A, substantially as and for the purpose set forth.

Second, The combination with the shaft, D, and bar, E, with each other and with the tubs, C and A, substantially as described and for the purpose set forth.

Third, The combination of the gear wheels, L and M, with each other, with the shaft, H, and with the revolving tub, C, substantially as described and for the purpose set forth.

Fourth, The combination with the gear wheels, K and G, with each other, with the crank shaft, H, and vertical shaft, D, substantially as described and for the purpose set forth.

Fifth, The combination of the flanges, N, arms, O, uprights, P, and flanges, R, with each other, with the shaft, D, and with the tub, C, substantially as described and for the purpose set forth,

[This invention has for its object to furnish a machine by means of which clothes may be washed quickly and thoroughly, and without subjecting them to the strain and wear consequent upon the operation of friction rollers and similar devices. And it consists of a revolving vertical shaft, furnished with arms which carry the clothes, and a revolving cylindrical tub. The tub and shaft revolve in opposite directions, and are each furnished with flanges which throw the water into violent agitation, which thoroughly wash the clothes as they are carried around by the revolution of the shaft.]

54,623.—Shovel Plow.—Timothy Terrell, Spring Hills, Ohio:

I claim the curved rear part of the beam, A, in combination with the brace, G, and standard, F, the latter being of double bevel form to receive the share, and all arranged substantially as and for the purpose herein set forth.

54,624.—Gun Stock and Barrel Attachment.—David C. Thrasher, Freetown, Mass.:

I claim the combination and arrangement of the clamp and the lifting screw thereof with the dovetailed tenon or tenons and the chamber applied to the stock and the barrel or barrels, substantially as described.

54,625.—Cotton Gin.—Edward Towne, Washington, D. C.:

I claim the arrangement of the teeth in the separator, as and for the purposes described and set forth in this specification, viz.: So arranging them that no two or more teeth can seize upon the same fiber at the same time, and thereby break it by drawing it across the bars of the grating; and yet so arranging the teeth that all the insterstices between the bars of the grating will be penetrated alternately, so as to draw the cotton equally from all parts of the mass, as specified.

Second, I claim the studded or knobbed roller, F, or a set of such rollers operating in combination with the endless apron, E, as described, and for the purposes set forth in this specification.

Third, I claim in combination the revolving cylindrical receiver, H H, with its two gratings, a and b, operating together as and for the purposes described and set forth in this specification.

51,626.—Spirit Level.—Andrew J. Vandergrift, Cincinnati, Ohio. Antedated April 25, 1866:

First, I claim forming liquid chamber, t, by turning or otherwise forming a uniform groove in metal or other suitable material, and providing the same with a transparent face, the same being fitted and hermetically sealed, forming a uniform liquid chamber, substantially in the manner and for the purpose set forth.

Second, Stocks, A, liquid chamber, t, circuitous liquid chamber, g g, dial plate, D, and segmentary dial plate, E E, all contained, in the manner and for the purpose set forth,

54,627.—Hay Loader.—Frank Van Etten, Jackson, Mich.:

I claim the bent lever, E, having the fork, G, or rake, I, pivoted to the outer end of its lower arm, e, in combination with this lever, F, swivel standard, D, the cords and catch, and the bed piece B, connected to the arm, A, all being arranged and applied to a wagon or cart, to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new and improved device for loading wagons or carts with hay, and is designed to supersede the tedious and laborious work of pitching the hay on the wagon or cart by hand. The invention consists of a fork or rake and levers applied to a pivoted standard, which is secured to an arm attached to the vehicle, and all arranged in such a manner that the hay, as the wagon or cart is drawn along, will be taken up by the fork or rake either from the cock, winrow or swath, and by a simple manipulation on the part of the operator, deposited on the wagon or cart.]

54,628.—Manufacture of Artificial Stones for Grinding and Polishing Metals.—Hartwich Von Unworth, New York City:

I claim the manufacture of artificial stones from the ingredients named and by the processes and for the purpose and in the manner substantially as herein described and set forth.

54,629.—Vacuum Pan.—Christian Wahl, Chicago, Ill.:

I claim, First, Evaporating liquids by passing them in a continuous current through an air-tight receiver or vacuum pan, placed in a horizontal position or nearly so, to which pan the requisite degree of heat is imparted by steam or any other suitable medium, substantially as and operating in the manner described.

Second, Connecting the vacuum pan with the condenser for the vapors arising from the evaporation of the liquid within the pan, by and through a series of pipes, or their equivalent, communicating with the said condenser, substantially in the manner described, and for the purpose specified,

54,630.—Reversing Attachment to Treadles.—Alban Warth, Stapleton, N. Y.:

I claim the arrangement of the lever cam, E, spring, b, and the friction roller, b', and spring, e, in combination with the crank shaft, A, pin, a, and treadle, D, and operating in the manner and for the purpose herein specified.

54,631.—Clothes Wringer.—Henry Whele, Hoboken, N. J.:

First, I claim the hollow metallic shafted rollers, K L, substantially as herein described and for the purpose specified.

Second, The mechanism for fastening the clothes wringer to the washtub as shown in Fig. 2, consisting of the links, l m n p, the longitudinal washer, q, the smooth nut, r, and pin, s, substantially as described, and for the purpose specified.

Third, The mechanism for fastening the clothes wringer to the washtub, as shown in Fig. 6, consisting of the links, l m u p, the washer, q, in combination with the nut, x v w, substantially as described and for the purpose specified.

54,632.—Churn.—Hiram W. White, Olney, Ill.:

I claim the washer, pyramidal or conical gradatory exterior and interior chamber, substantially as described and presented.

Second, The churn with its interior surface, corrugated or grooved, substantially as and for the purpose described.

54,633.—Corn Planter.—Morris Wilkinson, Burlington, Mich.:

I claim forming a chamber for the portions of the axle, C, containing the seed cells, e, or for any equivalent seed cylinder, by means of the plow stock, G, and seed tube, J, when arranged relatively with each other, and with the axle and hopper, and constructed and connected substantially in the manner and for the purpose herein described.

Second, I claim the employment of pivoted coverers, S, in combination with the rods, R, and adjustable spring, M, substantially as, and for the purpose herein specified.

54,634.—Churn.—Nimrod E. Wilson, Central Station, West Va.:

First I claim actuating a churn by means of one or more spiral springs communicating motion through wheels, M and I, and endless screws, K and H, substantially in the manner set forth.

Second, I claim giving an oscillating motion to the barrel of a churn by means of crank, F, and dasher, E the churn being suspended on pivots, substantially in the manner and for the purpose set forth.

54,635.—Mode of Grinding Bones for Manure, Etc.—Jacob Wister, Greencastle, Pa.:

I claim mixing hard plaster, plaster of paris or gypsum, or its equivalent, with bones and grinding such mixture for the purpose of facilitating the process of grinding and preventing the mill from gumming, substantially in the manner and for the purposes set forth.

54,636.—Pump.—David S. Wood, Delevan, Wis.:

I claim the annular packing, P, applied around the piston, D, upon the upper ends of the interior cylinder, substantially as and for the purpose specified.

54,637.—Cultivator.—Benjamin F. Young, Toulon, Ill:

First, I claim the inside frame, B, and the mode of connecting it with the frame, A, constructed and operated substantially as described.

Second, The iron lever, F, hung upon a pivot by which the front shovels are swung to the right or left.

Third, The adjustable wooden wedges, I, together with the crooked iron necks, D, by which the front shovels are adjusted so as to throw the dirt to or from the corn.

Fourth, The side or gage, P, by which is adjusted the depth the shovels enter the ground.

54,638.—Machine for Making Carriage Axles.—Calvin Young, Auburn, N. Y.:

I claim forming a solid swell or collar on axles and giving the bed or arm thereof a set by one and the same operation by means of a stationary and a movable clamping die that seize the bar or blank at points remote from its ends, and leaves uncontrolled that portion of the bar or blank from which the enlargement is to be made until the dies are about to meet, when said enlargement is jammed up into the proper form by said dies, substantially in the manner herein described and represented.

54,639.—Machine for Making Carriage Axles.—Calvin Young, Auburn, N. Y.:

I claim forming a solid collar or shoulder on an axle by griping the bar or blank of which the finished axle is made, at two points remote from its ends by griping dies so as to leave a portion of said bar between the two sets of dies uncontrolled and free to expand laterally by end pressure applied to one of the griping dies until near the end of the movement of said dies, when the expanded or swelled metal may be driven into the dies to give it better form and shape by means, substantially as herein described and represented.

54,640.—Cork Screw.—John Adt (assignor to Elisha Turner), Walcottville, Conn.:

I claim the slotted metallic case, a, in combination with the, T, head, e, of the instrument, c, as and for the purpose specified.

54,641.—Gate.—D. B. Baker (assignor to himself and P. S. Miller), Rollersville, Ohio:

I claim the braces, E E, so arranged that they will act as supports for sustaining the weight of the gate after it has passed its balancing point, substantially as specified.

54,642.—Corn and Seed Planter.—James Campbell (assignor to himself and William Campbell), Harrison, Ohio:

First, I claim a grain box whose front portion is supported and pivoted upon a curved fender plate, F, and whose rear portion is supported in notched posts G g G' g', substantially as describe.

Second, The grain box, E o o', having the pivoted front and perforated rear portion in the described combination with the adjustable hook, P Q q q', for the purpose set forth.

54,643.—Dies for Forming Gas Pipe.—Joseph Fieldhouse. Dighton, Mass., assignor to the Dighton Furnace Company, Taunton, Mass.:

I claim the combination and arrangement of the edge guide, C, with the pipe forming and welding die or its equivalent, substantially as set forth.

54,644.—Baling Press.—Dennis Frisbie and Samuel C. Goodsell (assignors to themselves and David P. Calhoun), New Haven, Conn.:

First, We claim the combination of the two pawls, S and S', having their eccentrics set opposite to each other, and upon the same shaft, with the platen of a press, when arranged to operate in the manner described so as to actuate the platen alternately at each end, substantially as and for the purpose specified.

Second, The combination of the hook, w, with the operating parts of a baling press, substantially as and for the purpose specified.

54,645. Water Wheel.—J. A. Hanson, Amsterdam, N. Y., assignor to himself, H. S. McElwain, Amsterdam, N. Y., and H. K. Kent, Pittsfield, Mass.:

I claim the buckets with the part, b, as described, lip c, rim, d, and supplementary portion, e, in combination with the hollow hub, a, of the wheel, B, arranged and operating in the manner and for the purpose herein described.

Second, The arrangement of the gate, C, sunken rack, g, pinion, D, and box, F, operating in the manner and for the purpose herein described.

54,646.—Eyelet Stock.—John W. Hoard (assignor to himself, S. W. Young and R. A. Dennison), Bristol, R. I.:

I claim the stock prepared as herein described, that is to say the strip or band in which a series of cups or depressions is formed, approaching the form and size required for the finished eyelets, substantially as and for the purposes herein set forth.

54,647.—Arranging Vats for Tanning Leather.—William La Dew, Norway, N. Y., assignor to himself and Horace U. Soper, Batavia, N. Y.:

First, I claim constructing a tan vat with slots or hooks, so that the leather may be hung in the tanning liquor, in combination with a movable wheel or other movable machinery, located in the bottom of the vat, to be operated either by hand or power, for the purpose of equalizing the strength of the tanning liquor, and imparting a motion to the leather hanging therein, constructed and arranged as described and for the purpose set forth.

Second, I claim placing in the bottom of the vat a movable wheel, with buckets or other movable machinery, so arranged as to be operated by hand or power, for the purpose of plunging up and agitating the tanning liquor, and also imparting a motion to the leather hanging therein, thus saving labor both in handling and laying away, constructed and arranged as described and for the purposes set forth.

54,648.—Harrow and Cultivator Combined.—Jacob K. Minich (assignor to himself and Jacob R. Hoffer), Mount Joy, Pa. Antedated September 25, 1865:

I claim the construction and arrangement of the shovels, 1, 2, 3, and 4, 5, 6, in combination with the cultivator, G, and its slotted side wings, H, all arranged and operating in the manner and for the purpose specified.

54,649.—Scoop for Excavating.—Augustus T. Morris, Bloomfield, N. J., assignor to himself and James Cummings, New York City:

First, I claim the construction of the frames, a', in combination with the cross plate, e', and block, 20, for the shaft, b, substantially as and for the purpose specified.

Second, I claim the combination of the cross bar or shaft, e, with the frames, a', said shaft, e, being guided at its ends in said frames, a', as specified.

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Third, I claim the plates, 24, attached to the frames, a', as set ferth, and receiving the joints or hinges by which the scoops g g, are attached, substantially as set forth.

Fourth, I claim the combination of two separate pairs of hinges, with the quadrant buckets as specified, so that the buckets shall open wider than the diameter of the buckets when closed, and increase the efficiency of the said bucket in excavating, as specified.

54,650.—Bit Brace.—Obed Peck, Southington, Conn., assignor to William A. Ives, New Haven, Conn.:

I claim the combination of the sleeve, C, with the socket, A, when the said sleeve is constructed with the vertical and inclined slot, a, and the socket provided with a pin, e, and arranged to operate in the manner and for the purpose substantially as specified.

54,651.—Roll for Wringers.—Hiram Robbins (assignor to himself and Thomas H. Foulds), Cincinnati, Ohio:

First, I claim a wringer roll composed of an external cylinder of rubber, and the longitudinally divided shaft, composed of the central rod, A a a', and roughened or indented segments, B B', substantially as and for the purpose set forth.

Second, In combination with the elements of the clause next preceding, I claim the guard or sheath, C, adapted to enable the insertion of the segments, B B', in the manner explained.

54,652.—Manufacture of Mowing Machine Guards.—Abel Simonds (assignor to himself, B. Snow, Jr., Alvin A. Simonds and George F. Simonds), Fitchburg, Mass.:

I claim the above specified mode of hardening the knife supporting surface of a mowing machine guard, and protecting the lip of such guard from being hardened at the same time.

54,653.—Ice Pick, Nut Cracker, Etc.—George L. Witsel (assignor to Charles A. Waterman), Philadelphia, Pa.:

I claim combining and arranging in one tool or instrument, an ice pick, d, gas burner forceps, and pipe tongs, and nut cracker, e, tack and nail extractor, f, nail and tack hammer, g, meat thrasher, h, and plate lifter, k, substantially as and for the purpose herein specified and described.

4,654.—Steam Generator.—William Zellner, New York City, assignor to himself and M. M. Rounds, New Haven, Conn., and J. E. Jerold, Jersey City, N. J.:

I claim a steam generator having a portion of the boiler extended into the fire box, for the purpose of increasing the heating surface thereof and distributing the heat thereon, substantially as and for the purpose described.

54,655.—Compressed Air Bath.—Paul T. Ware, Toronto, Canada:

First, I claim in combination with the compressed air chamber, A, and exterior jacket, B, the heating coil, a, or its equivalent, for radiating warmth equally through the metallic sides or walls of said bath chamber, substantially as set forth.

Second, I claim the combination and arrangement of the steam chest, E, and compressed air coil, d d, and valve, d', within the bath chamber, A, for warming and regulating the temperature of the condensed air before it enters the bath, substantially as shown and described.

Third, I claim in combination with a closed chamber or vessel for condensed air baths, and the pipes for the induction and eduction of air, water, etc., into and from the same, the employment of valves, r r and d', arranged within the bath chamber, so as to be controlled and operated exclusively by the patient confined therein, substantially as and for the purposes shown and described.

Fourth, I also claim in combination with a compressed air bath chamber, the safety valve, l', so arranged as to be inaccessible to the occupant of the bath, substantially as and for the purpose described.

Fifth, I also claim in combination with the air chamber, A, and water reservoirs, L and M, the pipes u u, or their equivalent, for the purpose of maintaining within said reservoirs, a pressure corresponding with that within the air bath, as and for the purpose set forth.

54,656.—Method of Boring Oil Wells.—James H. Clapham, New York City:

First, I claim the arrangement of the band wheel, d, crank pin, l, connecting rod, g, and slide, h, in the manner specified and for the purposes set forth.

Second, I claim the friction clutch, p, and rope barrel, n, in combination with the shaft, e, connecting rod, g, and slide, h, for operating the bearing tool, as specified, so that the said boring tool can be drawn up by the direct application of power to the tool rope, in the manner set forth.

Third, I claim the fork or slotted lever, r, actuating the temper screw progressively by motion from the pitman, as set forth.

Fourth, I claim the forks or slotted lever for rotating the rope clamp progressively by motion from the pitman, as set forth.

Fifth, I claim connecting the temper screw directly to the reciprocating crosshead, as specified, thereby dispensing with the slings heretofore employed for suspending the said temper screw.

Sixth, I claim the combination of the rope, m, clamp, l, with its rotating device, r' and s', temper screw, k, with its rotating device, r and s, and connecting yoke, 14, and the windlass, n, arranged, constructed and operated as described, as and for the purpose set forth.

54,657.—Vessel for Petroleum, Etc.—Edward L. Allen, Fairhaven, Vt.:

First, I claim the employment of the wooden box or casing, A, in combination with the metal receptacle, B, and surrounding the same in the manner and for the purpose hereinbefore described and set forth.

Second, I also claim the employment in a reservoir for the reception of kerosene and other volatile oils of the bottom, E, so constructed as to incline downward in a conical or other shape or form, to the point where the discharge pipe, F, is inserted, substantially in the manner and for the purposes herein described and set forth.

REISSUES.

2,237.—Packing for Tubes of Condensers.—Horatio Allen, New York City. Patented July 20, 1858:

I claim making the joint formed by two metal surfaces (as in the joints of the tubes in the tube sheets of surface condensers and other similar instruments) tight, by inserting between the tube and tube sheet a tube of seasoned or compressed wood, made either in one or several pieces, relying on the expansion of the wood after being saturated by water to make the joint tight, and on the freedom of the metal tube to move endwise without impairing the tightness of the joint, to avoid injurious results from the expansion and contraction of the metal tube, all substantially in the manner and for the purpose herein set forth.

And I also claim and desire to secure by letters patent, closing at any desired point, the annular space formed where a tube passes through a long cylindrical hole, by surrounding the metal tube at that point by a tube of seasoned or compressed wood (in one or several pieces or staves) of such thickness, that when saturated with water, it will fill water tight the annular space at that joint, substantially in the manner herein described.

2,238.—Revolving Fire-Arm.—Silas Crispin, New York City. Patented Oct. 3, 1865:

I claim in that class of fire-arms having a fixed barrel and many chambered rotating and bisected cylinder, with the parts swinging on a hinge of the frame forming the partial cartridge chambers, in each part of the cylinder with annual recesses to accommodate the fulminate flanch of a cartridge in combination with the means shown, or the equivalent, for allowing the said fulminate flanch of such cartridge to be exploded, as herein before set forth.

I also claim, in combination with a frame divided and hinged together as described, the employment of separate fixed centers or studs for the support of the revolving cylinder, one projecting forward from the rear, and the other backward from the forward portion of the said frame, as set forth.

Also claim the employment in combination with a hinged frame two cylinder sections, the whole so constructed and arranged that the said cylinder sections may be swung or vibrated on the hinge toward and from each other, substantially as and for the purposes set forth.

2,239.—Lantern.—James E. Cross, James F. Dane, and William Westlake (assignees of William Westlake), Chicago, Ill. Patented Dec. 12, 1865:

I claim connecting the dome or lamp part of a lantern to the guard by means of a ring or rod of the guard, and the spring catches, or their equivalents, substantially as and for the purposes herein shown and specified.

2,240.—Tobacco Press.—Alexander Harthill, New York City, assignee of J. A. Bawsel of Powhatan Court House, Va. Patented May 31, 1859:

First, I claim the process of pressing tobacco by passing it through the channel or groove, C', with the follower, B', working therein, substantially as shown and described.

Second, The combination of the rollers, B and C, with the endless belt or apron, I, arranged to operate as set forth.

Third, The combination of the springs, s, the elbow levers, T and T', rods, a and x, with the treadles, H, arranged to operate as herein described.

Fourth, The roller, V, located in a suitable position to lubricate the channel, C', or the follower, B, and supplied with oil from any suitable reservoir, substantially as set forth.

Fifth, I claim the scraper, U, when arranged to operate in connection with the channel, C', for the purpose of keeping the latter free from adhering substances, as set forth.

DESIGNS.

2,305.—Trade Mark.—Perre A. Berthold and Macklet Thompson, St. Louis, Mo.

2,306.—Ace of Spades.—Isaac Levy, New York City.

2,307.—Pen.—Edward A. Marsh, (assignor to Gaylord Manufacturing Company), Chicopee, Mass.

2,308.—Coffin Handle.—C. L. Neiberg, (assignor to Sargent & Company), New Haven, Conn.

2,309.—Tobacco Pipe.—Louis Saarbach, Philadelphia, Pa.

2,310.—Coat or Hat Hook.—J. B. Sargent, (assignor to Sargent & Company), New Haven, Conn.

2,311.—Ladies' Hood.—John Taylor, Philadelphia, Pa.

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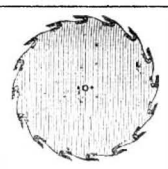

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After a test of five years's service, this Governor has proved itself far superior to any other hitherto in use. Of sufficient power and velocity to run the gate from open wide to close shut in from ten to twenty-five seconds, according to the size of the wheel, yet so extremely delicate in its action, and under such perfect control, that while it moves the gate instantly at any call, it will not run by.
Every Machine guaranteed to give entire satisfaction to the purchaser, or no sale.
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JOHN S. ROGERS, Treasurer.
For sale in New York by J. E. STEVENSON, 40 Dey street, and GEO. TALCOTT, 69 Liberty street.

TESTIMONIALS.

Laconia, N. H., Feb. 2, 1866.

TIMOTHY S. HOLTON:
Dear Sir:—The "Hydraulic Governor" which you put in operation in our mill gives *perfect satisfaction*. We shall order of you two more for our other mills as soon as we get the water wheels ready. I have been in the manufacturing business forty years; have used and experimented with all kinds of Governors for regulating water wheels that have come to my notice. I have always felt the want and necessity of a Governor to regulate instantaneously. In fact there have been thousands of dollars spent to arrive at just what your Governor accomplishes. We are now running seven sets of woolen machinery in the mill where your Governor is used. We can stop or start one-half or more of the machinery simultaneously, and it will regulate the quantity of water upon the wheel so rapidly that there is no inconvenience experienced in the variations of speed. It not only increases the production of the mill, but gives such even speed to the machinery that it is less liable to get out of order, consequently requires less repairs.
Most truly yours, S. T. THOMAS.

Trenton, N. J., June 14, 1865.

MR. J. E. GILLESPIE:
Sir:—We have used one of your Governors on our water wheel nearly three years. We run over two and one-half years without replenishing the oil. The power from our wheel is consumed chiefly in grinding and polishing. This kind of work has hitherto occasioned great and troublesome variations of speed. We find that your Governor obviates these difficulties. We recommend it as the only Governor within our knowledge that can regulate the speed of a water wheel which is used to do work requiring such great variations in power.
Yours truly, FISHER & NORRIS.

Amsterdam, N. Y., April 28, 1866.

MR. J. E. GILLESPIE:
Dear Sir:—I have had in use your Regulator since November, 1862, and find that it works to my entire satisfaction, doing all you claimed for it. When you proposed to regulate my twenty-four foot breast wheel, with my irregular machinery, I had very little confidence in your success, having tried so many different kinds and all failed to give me a regular and uniform speed, which yours does. We can now throw off and on our heavy pickers without noticing hardly a perceptible difference in the motion, and I unhesitatingly say it is the best Regulator I have ever seen.
Truly yours, STEPHEN SANFORD.

Lowell, Mass., Jan. 5, 1866.

GILLESPIE GOVERNOR COMPANY:
Gentlemen:—We have given your Governor a fair and impartial trial, and are much more than satisfied with the result; it giving an uniformity of speed we believe never before attained by any other on a water wheel, and rivalling the most perfectly regulated steam engine. Our speed cannot be forced down by throwing on our heaviest machines, several at a time, more than two turns on the mainshaft, and that only for a few seconds. Our test of speed is broad drop box looms, running sixty-five picks per minute, with one hundred and twelve inches traverse of shuttle from box to box.
Truly yours, L. W. FAULKNER & SON.

Wolcottville, Conn., Jan. 9, 1866.

MR. TIMOTHY S. HOLTON:
Dear Sir:—We will say that the success of a Regulator on our wheels (two three feet Cushman's), has always been a matter of much doubt in our minds, for the gates moved quite difficultly, and we apply power to a variety of machinery in a perfectly reckless and irregular manner, using more or less of any description in every part of our works without regard to the effect on any other portion; consequently those running small machines have been seriously annoyed by the fluctuations in speed, being unable to make as perfect goods as we wished, but now we find the Regulator automatically doing that which no human supervision could begin to do as effectually and quickly; so that every man in our employ is delighted to find he can run the machinery under his charge with uniform speed, hour after hour, no matter what else is going on.
The operations of the Governor satisfy us that you have furnished a *perfect machine*, thoroughly constructed and well finished throughout. Very Respectfully yours,
TURNER & CLARK, Manufacturing Co.
S. L. CLARK, Treasurer.

Lawrence, Mass., Jan. 3, 1866.

MR. TIMOTHY S. HOLTON, Agent:
Dear Sir:—We have had one of your Regulators in use for over a year, and we feel it a duty we owe you to say that it is as near perfection as a machine can be, and will add that money would not tempt us to be without one. Respectfully yours,
SAMUEL ROBINSON & CO.

South Easton, Penn., March 27, 1866.

MR. J. E. GILLESPIE:
Dear Sir:—In regard to your inquiry whether we can suggest any improvement in the construction of your Patent Governor, two of which we have had in constant use since the latter part of 1862, and during *many* months of that time in service *day* and *night*, we beg to say that we cannot but pronounce the Governor a most excellent application of an undoubtedly true principle. Neither machine has cost us a dime for repairs since the day they were set up; nor have we lost a moment of time by reason of any failure of either machine to do its work. The best evidence we can give of our appreciation of the merits of your Governor is the order herewith handed you for another. Wishing you success in the introduction of a most valuable invention, we are, truly yours,
STEWART & CO,

Medway, Mass., May 4, 1866.

GILLESPIE GOVERNOR CO.:
Gentlemen:—After a fair trial of one of your Regulators, we do not hesitate to recommend it as being the best Regulator we have ever seen. Very respectfully yours,
E. C. WILSON & CO.

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It is formed or a combination of cast-iron hollow spheres,—each 8 inches in external diameter, and ⅜ths of an inch thick, connected by curved necks These spheres are held together by wrought iron bolts with caps at the ends. The form is the strongest known: its strength to resist internal pressure very great—unweakened as it is by punching or riveting, which lessens the strength of the wrought iron boiler plate about forty per cent. Every boiler is tested by hydraulic pressure at 400 pounds to the square inch. It cannot be burst under any practicable steam pressure.

Under pressure which might cause rupture in ordinary boilers, every joint in this becomes a safety valve. No other steam generator possesses this property of relief, under extreme pressure without injury to itself, and thus preventing disaster.

It is not affected by corrosion, which soon destroys the wrought-iron boiler. Most explosions occur from this cause. It has economy in fuel equal to the best boilers, arising from the large extent and nearness to the fire of its heating surface, as also from the waved line of this surface, which, thoroughly mixing the gases, induces better combustion, and breaking the flame, causes the heat to be more effectually absorbed than in the ordinary tubular or cylinder boiler.

It gets up steam quickly, and with little fuel. It produces superheated steam without separate apparatus, and is not liable to priming or foaming.

It is easily transported, and may be taken apart so that no piece need weigh more than eighty pounds. In difficult places of access, the largest boiler may be put through an opening one foot square. It is readily cleaned inside and out. Under ordinary circumstances, it is kept free from permanent deposit by blowing the water entirely out, under full pressure once a week. It requires no special skill in its management Injured parts can be renewed with great facility, as they are uniform in shape and size. When renewed the entire boiler remains as good as new. The greater part of the boiler will never need renewal, unless unfairly used.

A boiler can be increased to any extent by simply adding to its width, and being the multiplication of a single form, its strength remains the same for all sizes. It has less weight, and takes less than one-half the ground area of the ordinary cylinder boiler, without being increased in hight

Any kind of fuel may be used under this boiler, from the most expensive to refuse coal dust.

Drawings and Specifications free of charge. For descriptive circulars or price address JOSEPH HARRISON, JR.,
Harrison Boiler Works, Gray's Ferry Road,
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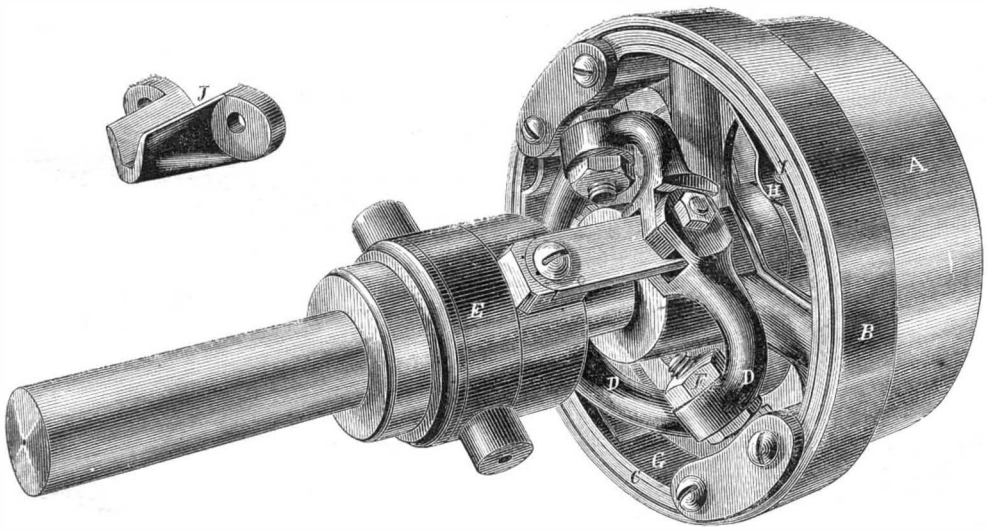
Friction pulleys are coming into use gradually in shops. It is found that the reduced number ot belts and the trouble of keeping them in order, fully compensates for whatever repairs are needed in the pulleys from time to time. We give herewith an illustration of a new friction pulley, which the inventor claims to be useful for a great variety of machines.

In detail this pulley consists of a belt wheel, A, and friction wheel, B, both fastened together but distinct from each other. Inside the friction wheel is a band, C, which drives the belt wheel, when thrown in contact with the friction wheel by the toggle joint, D. This joint is worked by a coupling, E, sliding on



BROWN'S FRICTION PULLEY.

the main shaft, and operated on by the shipping bar, common to all systems of pulleys and belts.

The toggle-joint arms are capable of accurate adjustment by means of nuts, F, so that the force with which the inner band, C, is pressed against the wheel, B, can be regulated. The end of these screws are wedge-shaped and work between the ends of the inner band, C, which is, of course, cut so that it can be forced into contact with the wheel, as before explained.

A ring, G, is also provided, which is held by screws so that it does not move. To this ring, springs, H, one on each side, are fixed, having holes through which screws, I, riveted to the band, C, pass. These springs keep the band, C, from rubbing on the driving wheel, thus preventing them from grinding and wearing untrue when not in use.

When this pulley is used on screw cutting lathes a V-shaped casting shown, at J, is provided and fastened to the pulley to prevent the wedging screw from slipping out.

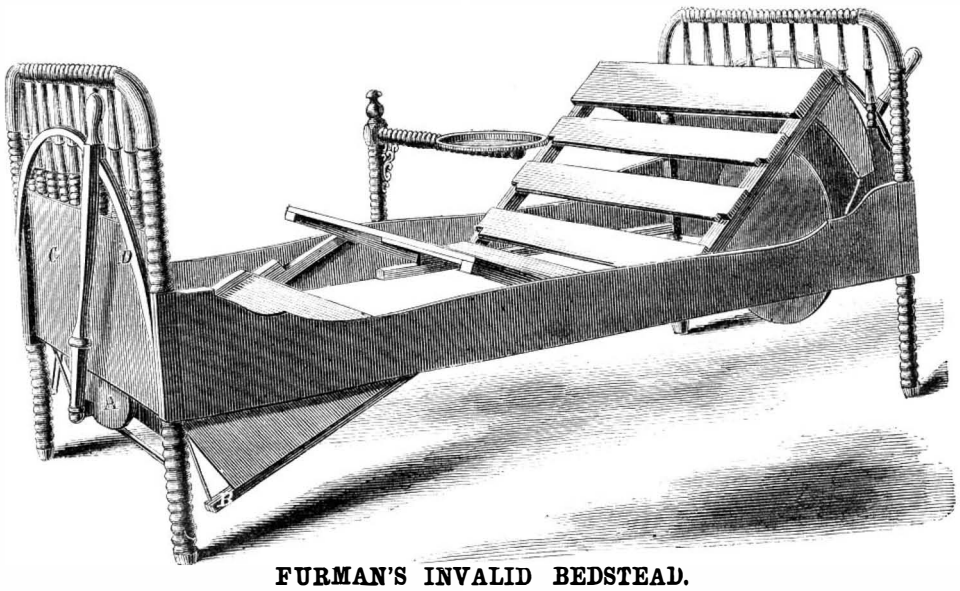
The invention was patented on Nov. 28, 1865, by W. H. Brown, of Worcester, Mass., whom address for further information.

Improved Invalid Bed.

Those who have tended the sick know how difficult it is to arrange their position satisfactorily. In many diseases the patient is extremely sensitive, and the most careful handling causes acute suffering.

In such cases the bed here shown will prove a convenience. It is simply arranged for its object and easily operated. Any angle or posture from the horizontal may be obtained, and that without touching the sufferer. The bottom of the bed is separated and parts of it work on hinges. The headboard and footboard have pulleys, A, fitted on them, over which run cords attached to the bottom, as at B. These pulleys are moved on their axes by the levers, C, which work over a segment, D, provided with notches to hold them at any desired point. Any one can see from this arrangement that the head can be raised or the feet elevated; in short, any desired change can be instantly made, and as often as necessary. This will save a great deal of pain to sick people, and labor to the well who watch them.

It was patented through the Scientific American Patent Agency by O. P. Furman, on Nov. 22, 1864. For further information address Furman & Wells, Addison, N. Y.



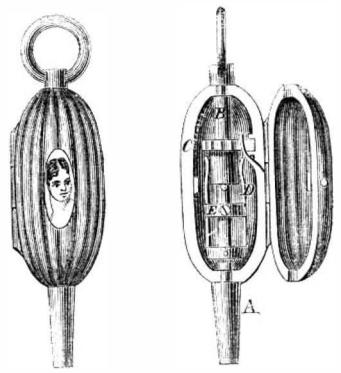
FURMAN'S INVALID BEDSTEAD.

BURNING OF THE NEW HAVEN CLOCK COMPANY BUILDINGS.—Last week one of the buildings of the New Haven Clock Company was discovered to be on fire. The flames spread rapidly in spite of the fire department until all the buildings of the clock company—seven in number—were consumed. Seven dwelling houses in the vicinity were also destroyed with nearly all their contents. Twenty families are rendered homeless and about 200 workmen thrown out of employment. The total loss is estimated at $200,000. The company had an insurance of $146,000 on their manufactory. This was the most destructive conflagration ever experienced in New Haven.

REMINGTON'S WATCH KEY.

The accompanying engraving represents an improved watch key—one entirely harmless to the watch even in the hands of a child. Many persons have been annoyed by the frequent derangement of watches by overwinding, or by turning the key in the wrong direction, neither of which can occur by the use of this key. The details are as follows:—

The pipe, A, is fastened to the shaft, B, which has the usual swivel at its opposite end. Turning loosely upon the shaft is a ratchet wheel, C, having a neck on one side, or end of the same, with two or more of the sides of the neck flattened, as bearings for the spring, D. These springs are fastened on the shaft, B, with an arrangement for adjusting this



tension attached, as shown by the sliding collar, E. All is inserted in a case with bearings at each end for the shaft, B, to revolve in. A pawl or latch is hung to the inside of said case opposite the ratchet wheel, C, connecting with and turning the same; as the case is turned in winding the watch, the latch is kept in contact with the ratchet by a small spring.

It will be seen at a glance that this key will not strain a watch, as the springs, D, being of the proper tension, will readily open when the watch is wound clear up, and thus relieve the shaft, B. The case can easily be turned in the opposite direction in process of winding without detaching the fingers therefrom.

The key can be made right or left according to the position of the pipe. On one end of the shaft it is right, on the other it is left.

As the inventor is otherwise engaged, liberal arrangements will be entered into with parties for the manufacture and sale of this key. Patented through SCIENTIFIC AMERICAN Patent Agency, April 24th, 1866. Address Geo. H. Remington, Lock Box 154, Providence, R. I.

MECHANICS

INVENTORS, MANUFACTURERS,

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